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CALIFORNIA BUILDING STANDARDS COMMISSION

CALIFORNIA 2025 FIRE CODE

CALIFORNIA CODE OF REGULATIONS | TITLE 24 PART 9

BASED ON THE 2024 INTERNATIONAL FIRE CODE®

INTERNATIONAL CODE COUNCIL®

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CALIFORNIA BUILDING STANDARDS COMMISSION

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CALIFORNIA FIRE CODE 2025

CALIFORNIA CODE OF REGULATIONS ▯ TITLE 24 PART 9

BASED ON THE 2024 INTERNATIONAL FIRE CODE®

Effective January 1, 2026

For Errata and Supplement effective dates see the History Note Appendix

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California Code of Regulations, Title 24, Part 9

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PREFACE

This document is Part 9 of thirteen parts of the official triennial compilation and publication of the adoptions, amendments and repeal of administrative regulations to *California Code of Regulations, Title 24,* also referred to as the *California Building Standards Code.* This part is known as the *California Fire Code.*

The *California Building Standards Code* is published in its entirety every three years by order of the California legislature, with supplements published in intervening years. The California legislature delegated authority to various state agencies, boards, commissions and departments to create building regulations to implement the State's statutes. These building regulations, or standards, have the same force of law, and take effect 180 days after their publication unless otherwise stipulated. The *California Building Standards Code* applies to occupancies in the State of California as annotated.

A city, county, or city and county may establish more restrictive building standards reasonably necessary because of local climatic, geological or topographical conditions. Findings of the local condition(s) and the adopted local building standard(s) must generally be filed with the California Building Standards Commission (or other filing if indicated) to become effective, and may not be effective sooner than the effective date of this edition of the *California Building Standards Code*. Local building standards that were adopted and applicable to previous editions of the *California Building Standards Code* do not apply to this edition without appropriate adoption and the required filing.

Should you find publication (e.g., typographical) errors or inconsistencies in this code or wish to offer comments toward improving its format, please address your comments to:

California Building Standards Commission
2525 Natomas Park Drive, Suite 130
Sacramento, CA 95833-2936

Phone: (916) 263-0916
Email: cbsc@dgs.ca.gov

Web page: www.dgs.ca.gov/bsc

ACKNOWLEDGMENTS

The 2025 *California Building Standards Code* (Code) was developed through the outstanding collaborative efforts of the Department of Housing and Community Development, Division of the State Architect, Office of the State Fire Marshal, Department of Health Care Access and Information, California Energy Commission, California Department of Public Health, California State Lands Commission, Board of State and Community Corrections, Department of Water Resources, State Historical Building Safety Board, Department of Consumer Affairs, State Librarian, Department of Food and Agriculture, and the California Building Standards Commission (Commission).

This collaborative effort included the assistance of the Commission's Code Advisory Committees and many other volunteers who worked tirelessly to assist the Commission in the production of this Code.

Governor Gavin Newsom

Members of the California Building Standards Commission

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Rajesh Patel – Vice-Chair

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Laura Rambin
Frank Ramirez
Elley Klausbruckner
Juvilyn Alegre
Kent Sasaki
James Haskin

Stoyan Bumbalov – Executive Director
Kevin Day – Deputy Executive Director

For questions on California state agency amendments, please refer to the contact list on page v.

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CALIFORNIA CODE OF REGULATIONS, TITLE 24

California State Agency Contact List

The following state agencies may propose building standards for buildings, structures and applications under their authority for publication in Title 24. Notice of such proposals may be requested from each agency. See Sections 1.2 through 1.14 of the California Building Code (Part 2, T24) for detailed information on the regulatory authority of most state agencies summarized below. Note [agency acronyms] shown in banners/Matrix Adoption Tables in T24.

Board of State and Community Corrections [BSCC]
bscc.ca.gov — BSCC-Mail@bscc.ca.gov
(916) 445-5073 — *Local Detention Facilities*

Building Standards Commission [BSC, BSC-CG]
dgs.ca.gov/BSC — cbsc@dgs.ca.gov
(916) 263-0916 — *State Buildings including UC & CSU Nonresidential Green Building Standards*

Department of Consumer Affairs Boards/Bureaus:

Acupuncture Board [CA]
acupuncture.ca.gov — AcuPolicy@dca.ca.gov
(916) 515-5200 — *Acupuncture Offices*

Board of Pharmacy [CA]
pharmacy.ca.gov
(916) 518-3100 — *Pharmacies*

Board of Barbering and Cosmetology [CA]
barbercosmo.ca.gov — barbercosmo@dca.ca.gov
(916) 574-7570 — *Barber, Cosmetology & Electrolysis Establishments*

Bureau of Household Goods and Services [CA]
bhgs.dca.ca.gov
(916) 999-2041 — *Insulation Testing*

Structural Pest Control Board [CA]
pestboard.ca.gov — pestboard@dca.ca.gov
(800) 737-8188 — *Structural Pest Control Locations*

Veterinary Medical Board [CA]
vmb.ca.gov — vmb@dca.ca.gov
(916) 515-5220 — *Veterinary Facilities*

Department of Food and Agriculture [AGR]
cdfa.ca.gov
(916) 900-5004 — *Rendering & Collection Centers*
(916) 900-5064 — *Meat & Poultry Packing Plants*
(916) 900-5008 — *Milk & Dairy Food Safety*

Department of Health Care Access and Information

Office of Statewide Hospital Planning and Development
[OSHPD 1, 1R, 2, 3, 4, 5, 6]
hcai.ca.gov — regsunit@hcai.ca.gov
(916) 440-8300 — *Hospital Standards, Skilled Nursing Facility Standards & Clinic Standards*

Department of Public Health [DPH]
cdph.ca.gov (Recreational Health)
(916) 449-5661 — *Food Establishments, Organized Camps, Public Swimming Pools*

Department of Housing and Community Development
[HCD 1, 2, 1-AC]
hcd.ca.gov — Title24@hcd.ca.gov
(800) 952-8356
Option 5 > Option 2 — *State Housing Law: including Housing Accessibility, Hotels/Motels, Apartments/Condominiums, Dormitories, Single-Family Dwellings, ADUs, Permanent Structures in Mobile Home Parks*
Option 5 > Option 4 — *Factory-Built Housing*
Option 5 > Option 5 — *Employee Housing*

Department of Water Resources [DWR]
water.ca.gov — DWRwebcomment@water.ca.gov
(916) 653-5791 — *Plumbing for Recycled Water, Floodplain Construction*

Division of the State Architect
dgs.ca.gov/DSA
(916) 445-8100

Access Compliance [DSA-AC]
(916) 445-5827 — DSAaccess@dgs.ca.gov
Access for Persons with Disabilities

Structural Safety [DSA-SS, DSA-SS/CC]
Public Schools & Community Colleges, State Essential Services Buildings

State Historical Building Safety Board [SHBSB]
(916) 445-7627shbsb@dgs.ca.gov
Historical Building Rehabilitation, Preservation, Restoration or Relocation

Energy Commission [CEC]
energy.ca.gov — Title24@energy.ca.gov
(800) 772-3300 — *Building Energy Efficiency, Compliance Manual & Compliance Forms*

Office of the State Fire Marshal [SFM]
osfm.fire.ca.gov — codedevelopment@fire.ca.gov
(916) 568-3800 — *Fire & Life Safety*

State Lands Commission [SLC]
slc.ca.gov — MOTEMS.Public@slc.ca.gov
(510) 741-4950 — *Marine Oil Terminals*

State Librarian [SL]
library.ca.gov — csllaw@library.ca.gov
(916) 323-9843 — *Public Library Construction & Renovation*

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How to Distinguish Between Model Code Language and California Amendments

To distinguish between model code language and the incorporated California amendments, including exclusive California standards, California amendments will appear in italics.

***[BSC]** This is an example of a state agency acronym used to identify an adoption or amendment by the agency. The acronyms will appear at California Amendments and in the Matrix Adoption Tables. Sections 1.2 through 1.14 in Chapter 1, Division 1 of the California Building Code, explain the used acronyms, the application of state agency adoptions to building occupancies or building features, the enforcement agency as designated by state law (may be the state adopting agency or local building or fire official), the authority in state law for the state agency to make the adoption, and the specific state law being implemented by the agency's adoption. The following acronyms are used in Title 24 to identify the state adopting agency making an adoption.*

Legend of Acronyms of Adopting State Agencies

BSC	*California Building Standards Commission (see Section 1.2)*
BSC-CG	*California Building Standards Commission-CALGreen (see Section 1.2.2)*
BSCC	*Board of State and Community Corrections (see Section 1.3)*
SFM	*Office of the State Fire Marshal (see Section 1.11)*
HCD 1	*Department of Housing and Community Development (see Section 1.8.2.1.1)*
HCD 2	*Department of Housing and Community Development (see Section 1.8.2.1.3)*
HCD 1/AC	*Department of Housing and Community Development (see Section 1.8.2.1.2)*
DSA-AC	*Division of the State Architect-Access Compliance (see Section 1.9.1)*
DSA-SS	*Division of the State Architect-Structural Safety (see Section 1.9.2)*
DSA-SS/CC	*Division of the State Architect-Structural Safety/Community Colleges (see Section 1.9.2.2)*
OSHPD 1	*Office of Statewide Hospital Planning and Development (see Section 1.10.1)*
OSHPD 1R	*Office of Statewide Hospital Planning and Development (see Section 1.10.1)*
OSHPD 2	*Office of Statewide Hospital Planning and Development (see Section 1.10.2)*
OSHPD 3	*Office of Statewide Hospital Planning and Development (see Section 1.10.3)*
OSHPD 4	*Office of Statewide Hospital Planning and Development (see Section 1.10.4)*
OSHPD 5	*Office of Statewide Hospital Planning and Development (see Section 1.10.5)*
OSHPD 6	*Office of Statewide Hospital Planning and Development (see Section 1.10.6)*
DPH	*Department of Public Health (see Section 1.7)*
AGR	*Department of Food and Agriculture (see Section 1.6)*
CEC	*California Energy Commission (see Section 100 in Part 6, the California Energy Code)*
CA	*Department of Consumer Affairs (see Section 1.4):* *Board of Barbering and Cosmetology* *Board of Examiners in Veterinary Medicine* *Board of Pharmacy* *Acupuncture Board* *Bureau of Household Goods & Services* *Structural Pest Control Board (SPCB)*
SL	*State Library (see Section 1.12)*
SLC	*State Lands Commission (see Section 1.14)*
DWR	*Department of Water Resources (see Section 1.13 of Chapter 1 of the California Plumbing Code in Part 5 of Title 24)*

The state agencies are available to answer questions about their adoptions. Contact information is provided on page iv of this code.

To learn more about the use of this code refer to pages viii and ix. Training materials on the application and use of this code are available at the website of the California Building Standards Commission www.dgs.ca.gov/bsc.

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California Matrix Adoption Tables

Format of the California Matrix Adoption Tables

The matrix adoption tables, examples of which follow, are nonregulatory aids intended to show the user which state agencies have adopted and/or amended given sections of the model code. An agency's statutory authority for certain occupancies or building applications determines which chapter or section may be adopted, repealed, amended or added. See Chapter 1, Division I, Sections 1.2 through 1.14 for agency authority, building applications and enforcement responsibilities.

The side headings identify the scope of state agencies' adoption as follows:

Adopt the entire IFC chapter without state amendments.

If there is an "X" under a particular state agency's acronym on this row, this means that particular state agency has adopted the entire model code chapter without any state amendments.

Example:

CALIFORNIA FIRE CODE-MATRIX ADOPTION TABLE
CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS
(Matrix Adoption Tables are nonregulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD							BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4	5	6							
Adopt entire chapter			X																				
Adopt entire chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below								S	A	M	P	L	E										
Chapter/Section																							

Adopt the entire IFC chapter as amended, state-amended sections are listed below:

If there is an "X" under a particular state agency's acronym on this row, it means that particular state agency has adopted the entire model code chapter; with state amendments.

Each section that a state agency has amended and/or added within a particular chapter is listed. There will be an "X" under an agency's acronym in the row of the amended and/or added section.

Example:

CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD							BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4	5	6							
Adopt entire chapter																							
Adopt entire chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below								S	A	M	P	L	E										
Chapter/Section																							
202			X																				

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Adopt only those sections that are listed below:

If there is an "X" under a particular state agency's acronym on this row, it means that particular state agency is adopting only specific model code or state-amended sections within this chapter. There will be an "X" in the column under the agency's acronym, as well as an "X" by each section that the agency has adopted.

Example:

CHAPTER 2 – DEFINITIONS AND ABBREVIATIONS

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA			OSHPD							BSCC	DPH	AGR	DWR	CA	SL	SLC
				1	2	1-AC	AC	SS	SS/CC	1	1R	2	3	4	5	6							
Adopt entire chapter																							
Adopt entire chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below					**X**	**X**		S	A	M	P	L	E										
Chapter/Section																							
202					X	X																	
203					X	X																	

California Matrix Adoption Tables with California Code of Regulations, Title 19, Division 1

State Fire Marshal T-24 Column:
If there is an "X" in the T-24 column under SFM, refer to the California Matrix Adoption Tables explaining how to use the matrix adoption tables.

State Fire Marshal T-19 Column:
If there is an "X" in the T-19 column under SFM, this means that the corresponding section was reprinted from the California Code of Regulations (CCR), Title 19, Division 1 into the *California Fire Code* for the code user's convenience. The corresponding Title-19 sections were listed in the matrix adoption tables in the order that they appear in the *California Fire Code*. The scope, applicability and appeals procedures of CCR, Title 19, Division 1 has not changed. For information regarding the specific purpose and scope of CCR, Title 19, unless otherwise specified, refer to CCR, Title 19, Division 1, Chapter 1, Subchapter 1, Article 1, Sections 1.00 through 1.14.

Example:

CHAPTER 3 – GENERAL PRECAUTIONS AGAINST FIRE

Adopting agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD							BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1-AC	AC	SS	1	1R	2	3	4	5	6								
Adopt entire chapter																								
Adopt entire chapter as amended (amended sections listed below)																								
Adopt only those sections that are listed below			**X**																					
[California Code of Regulations, Title 19, Division 1]				**X**																				
Chapter/Section							S	A	M	P	L	E												
301																								
[T-19 §3.14]		X																						
[T-19 §3.19 (a-g)]				X																				
304				X																				
[T-19 §3.07(a)]		X																						
[T-19 §3.07(b)]				X																				

*The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division 1 remains the same.

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MARGINAL MARKINGS

Symbols in the margin indicate the status of code changes as follows:

‖ This symbol indicates that a change has been made to a California amendment.

> This symbol indicates deletion of California amendment language.

| This symbol indicates that a change has been made to International Code Council model language.

➡ This symbol indicates deletion of International Code Council model language.

A single asterisk [*] placed in the margin indicates that text or a table has been relocated within the code. A double asterisk [**] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code.

RELOCATION OF TEXT OR TABLES

The following table indicates relocation of sections and tables in the 2024 edition of the IFC from the 2021 edition.

RELOCATIONS	
2024 LOCATION	**2021 LOCATION**
104.2.2	104.8.2
104.2.3	104.10
104.2.3.5	104.10.2
104.2.3.6	104.10.1
104.2.4	104.9
105.5.30	105.5.27
203	202 OCCUPANCY CLASSIFICATION
903.3.9	903.4.3
914.1.1.3	914.3.1.1.1
SECTION 3303 ADMINISTRATIVE SAFETY CONTROLS	SECTION 3303 OWNER'S RESPONSIBILITY FOR FIRE PROTECTION
3303.2.1	3303.6
3303.5	3305.5
3303.5.1	3305.5.1
3303.5.2	3305.5.2
3303.5.2.1	3305.5.2.1
3303.5.2.2	3305.5.2.2
3303.5.2.3	3305.5.2.3
3303.5.3	3305.5.3
3303.5.4	3305.5.4
3303.6	3310.1
SECTION 3304 PROTECTION OF COMBUSTIBLE MATERIALS	SECTION 3304 TEMPORARY HEATING EQUIPMENT
3304.1	3305.2
3304.1.1	3305.2.1
3304.1.2	3305.2.2
3304.1.3	3305.2.3
3304.2	3305.2.4
SECTION 3305 IGNITION SOURCE CONTROLS	SECTION 3305 PRECAUTIONS AGAINST FIRE
3305.1	3304.1
3305.1.1	3304.2

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RELOCATIONS—continued	
2024 LOCATION	**2021 LOCATION**
3305.1.2	3304.3
3305.1.3	3304.4
3305.1.4	3304.5
3305.1.5	3304.6
3305.2	3305.1
3305.5	3305.6
3305.6	3305.7
3305.7	3305.8
3305.8	3309.1
3305.9	3303.8
3305.10	3318.1
3305.10.1	3318.2
3305.10.2	3318.3
SECTION 3306 FIRE PROTECTION SYSTEMS AND DEVICES	SECTION 3306 FLAMMABLE AND COMBUSTIBLE LIQUIDS
3306.1	3303.7
3306.2	3303.9
3306.3	3303.9.1
3306.4	3303.10
3306.5	3315.1
3306.5.1	3315.2
3306.6	3316.1
SECTION 3307 FIRE DEPARTMENT SITE ACCESS AND WATER SUPPLY	SECTION 3307 FLAMMABLE GAS
3307.1	3311.1
3307.1.1	3311.2
3307.1.2	3312.1
3307.1.3	3312.2
3307.2	3313.1
3307.2.1	3313.2
3307.2.2	3313.3
3307.2.2.1	3313.3.1
3307.2.2.2	3313.3.2
3307.2.2.3	3313.3.3
3307.3	3313.4
3307.4	3313.5
3307.5	3314.1
3307.5.1	3314.2
3307.5.2	3314.3
SECTION 3008 MOTORIZED CONSTRUCTION EQUIPMENT	SECTION 3308 EXPLOSIVE MATERIALS
3308.1	3317.1
SECTION 3309 HAZARDOUS MATERIALS	SECTION 3309 PORTABLE GENERATORS
3309.1	3306.1
3309.1.1	3306.2
3309.1.2	3306.3

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RELOCATIONS—continued	
2024 LOCATION	**2021 LOCATION**
3309.1.3	3306.4
3309.1.4	3306.5
3309.1.5	3306.6
3309.2	307.1
3309.2.1	3307.2
3309.2.2	3307.2.1
3309.3	3308.1
3309.3.1	3308.2
3309.3.2	3308.3
SECTION 3310 ADDITIONAL SAFEGUARDS FOR OCCUPIED BUILDINGS	SECTION 3310 FIRE REPORTING
3310.1	3312.3
SECTION 3311 ADDITIONAL SAFEGUARDS FOR TYPES I AND II CONSTRUCTION	SECTION 3311 ACCESS FOR FIREFIGHTING
3311.1	3305.9
SECTION 3312 ADDITIONAL SAFEGUARDS FOR TYPE IV CONSTRUCTION	SECTION 3312 MEANS OF EGRESS
3312.1	3303.5
4101.5	3107.12.7
4101.6	3107.13
4102.1	603.9
4103.1	605.5
4104.2	308.1.4
4104.4	3107.12.6
4104.5	3107.12.5
4104.6	3107.12.4
4106	319

ABOUT THE I-CODES

The 2024 I-Codes, published by the ICC, are 15 fully compatible titles intended to establish provisions that adequately protect public health, safety and welfare; that do not unnecessarily increase construction costs; that do not restrict the use of new materials, products or methods of construction; and that do not give preferential treatment to particular types or classes of materials, products or methods of construction.

The I-Codes are updated on a 3-year cycle to allow for new construction methods and technologies to be incorporated into the codes. Alternative materials, designs and methods not specifically addressed in the I-Code can be approved by the building official where the proposed materials, designs or methods comply with the intent of the provisions of the code.

The I-Codes are used as the basis of laws and regulations in communities across the US and in other countries. They are also used in a variety of nonregulatory settings, including:

- Voluntary compliance programs.
- The insurance industry.
- Certification and credentialing for building design, construction and safety professionals.
- Certification of building and construction-related products.
- Facilities management.
- “Best practices” benchmarks for designers and builders.
- College, university and professional school textbooks and curricula.
- Reference works related to building design and construction.

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Code Development Process

The code development process regularly provides an international forum for building professionals to discuss requirements for building design, construction methods, safety, performance, technological advances and new products. Proposed changes to the I-Codes, submitted by code enforcement officials, industry representatives, design professionals and other interested parties, are deliberated through an open code development process in which all interested and affected parties may participate.

Openness, transparency, balance, due process and consensus are the guiding principles of both the ICC Code Development Process and OMB Circular A-119, which governs the federal government's use of private-sector standards. The ICC process is open to anyone without cost. Remote participation is available through cdpAccess®, the ICC's cloud-based app.

In order to ensure that organizations with a direct and material interest in the codes have a voice in the process, the ICC has developed partnerships with key industry segments that support the ICC's important public safety mission. Some code development committee members were nominated by the following industry partners and approved by the ICC Board:

- American Gas Association (AGA)
- American Institute of Architects (AIA)
- American Society of Plumbing Engineers (ASPE)
- International Association of Fire Chiefs (IAFC)
- National Association of Home Builders (NAHB)
- National Association of State Fire Marshals (NASFM)
- National Council of Structural Engineers Association (NCSEA)
- National Multifamily Housing Council (NMHC)
- Plumbing Heating and Cooling Contractors (PHCC)
- Pool and Hot Tub Alliance (PHTA) formerly The Association of Pool and Spa Professionals (APSP)

Code development committees evaluate and make recommendations regarding proposed changes to the codes. Their recommendations are then subject to public comment and council-wide votes. The ICC's governmental members—public safety officials who have no financial or business interest in the outcome—cast the final votes on proposed changes.

The I-Codes are subject to change through future code development cycles and by any governmental entity that enacts the code into law. For more information regarding the code development process, contact the Codes and Standards Development Department of the ICC at iccsafe.org/products-and-services/i-codes/code-development/.

While the I-Code development procedure is thorough and comprehensive, the ICC, its members and those participating in the development of the codes expressly disclaim any liability resulting from the publication or use of the I-Codes, or from compliance or noncompliance with their provisions. NO WARRANTY OF ANY KIND, IMPLIED, EXPRESSED OR STATUTORY, IS GIVEN WITH RESPECT TO THE I-CODES. The ICC does not have the power or authority to police or enforce compliance with the contents of the I-Codes.

Code Development Committee Responsibilities (Letter Designations in Front of Section Numbers)

In each cycle, proposed changes are considered by the Code Development Committee assigned to a specific code or subject matter. Committee Action Hearings result in recommendations regarding a proposal to the voting membership. Where changes to a code section are not considered by that code's own committee, the code section is preceded by a bracketed letter designation identifying a different committee. Bracketed letter designations for the I-Code committees are:

[A] = Administrative Code Development Committee

[BE] = CBC—Egress Code Development Committee

[BF] = CBC—Fire Safety Code Development Committee

[BG] = CBC—General Code Development Committee

[BS] = CBC—Structural Code Development Committee

[E] = Developed under the ICC's Standard Development Process

[EB] = International Existing Building Code Development Committee

[F] = International Fire Code Development Committee

[FG] = International Fuel Gas Code Development Committee

[M] = International Mechanical Code Development Committee

[P] = International Plumbing Code Development Committee

[SP] = International Swimming Pool and Spa Code Development Committee

For the development of the 2027 edition of the I-Codes, the ICC Board of Directors approved a standing motion from the Board Committee on the Long-Term Code Development Process to revise the code development cycle to incorporate two committee action hearings for each code group. This change expands the current process from two independent 1-year cycles to a single continuous 3-year cycle. There will be two groups of code development committees and they will meet in separate years. The current groups will be reworked. With the energy provisions of the *International Energy Conservation Code*® (IECC®) and Chapter 11 of the *International*

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Residential Code® (IRC®) now moved to the Code Council's Standards Development Process, the reduced volume of code changes will be distributed between Groups A and B.

Code change proposals submitted for code sections that have a letter designation in front of them will be heard by the respective committee responsible for such code sections. Because different committees hold Committee Action Hearings in different years, proposals for most codes will be heard by committees in both the 2024 (Group A) and the 2025 (Group B) code development cycles. It is very important that anyone submitting code change proposals understands which code development committee is responsible for the section of the code that is the subject of the code change proposal.

Please visit the ICC website at iccsafe.org/products-and-services/i-codes/code-development/current-code-development-cycle for further information on the Code Development Committee responsibilities as it becomes available.

Coordination of the I-Codes

The coordination of technical provisions allows the I-Codes to be used as a complete set of complementary documents. Individual codes can also be used in subsets or as stand-alone documents. Some technical provisions that are relevant to more than one subject area are duplicated in multiple model codes.

INTRODUCTION TO THE INTERNATIONAL FIRE CODE

The IFC is a model code that regulates minimum fire safety requirements for new and existing buildings, facilities, storage and processes. The IFC addresses fire prevention, fire protection, life safety and safe storage and use of hazardous materials in new and existing buildings, facilities and processes. The IFC provides a total approach of controlling hazards in all buildings and sites, regardless of the hazard being indoors or outdoors.

The IFC is a design document. For example, before one constructs a building, the site must be provided with an adequate water supply for firefighting operations and a means of building access for emergency responders in the event of a medical emergency, fire or natural or technological disaster. Depending on the building's occupancy and uses, the IFC regulates the various hazards that may be housed within the building, including refrigeration systems, application of flammable finishes, fueling of motor vehicles, high-piled combustible storage, and the storage and use of hazardous materials. The IFC sets forth minimum requirements for these and other hazards and contains requirements for maintaining the life safety of building occupants; protecting emergency responders; and limiting the damage to a building and its contents as the result of a fire, explosion or unauthorized hazardous material discharge.

As described, the IFC has many types of requirements for buildings and facilities. The applicability of these requirements varies. An understanding of the applicability of requirements, as addressed in Sections 102.1 and 102.2, is necessary. Section 102.1 addresses when the construction and design provisions are applicable, whereas Section 102.2 addresses when the administrative, operational and maintenance provisions are applicable. Generally, the construction and design provisions apply to only new buildings or existing buildings and occupancies as addressed by Chapter 11. The administrative, maintenance and operational requirements are applicable to all buildings and facilities, whether new or existing.

ARRANGEMENT AND FORMAT OF THE 2025 CFC

Before applying the requirements of the CFC, it is beneficial to understand its arrangement and format. The CFC, like other codes published by the ICC, is arranged and organized to follow sequential steps that generally occur during a plan review or inspection.

The CFC is organized into seven parts. Each part represents a broad subject matter and includes the chapters that logically fit under the subject matter of each part. It is also foreseeable that additional chapters will need to be added in the future as regulations for new processes or operations are developed. Accordingly, the structure was designed to accommodate such future chapters by providing reserved (unused) chapters in several of the parts. This will allow the subject matter parts to be conveniently and logically expanded without requiring a major renumbering of the CFC chapters.

CHAPTER TOPICS	
PARTS AND CHAPTERS	**SUBJECTS**
Part I—Chapters 1 and 2	Administrative and definitions
Part II—Chapters 3 and 4	General safety provisions
Part III—Chapters 5 through 12	Building and equipment design features
Part III—Chapters 13 through 19	Reserved for future use
Part IV—Chapters 20 through 41*; 48 and 49*	Special occupancies and operations
Part IV—Chapters 42 through *47*	Reserved for future use
Part V—Chapters 50, 51 and 53 through 67	Hazardous materials
Part V—Chapters *52,* 68 through 79	Reserved for future use
Part VI—Chapter 80	Referenced standards
Part VII—Appendices A through Q	Adoptable and informational appendices

California Building Code Correlated Topics

The CFC requirements for fire-resistance-rated construction, interior finish, fire protection systems, means of egress and construction safeguards are directly correlated to the chapters containing parallel requirements in the CBC as follows:

CFC/CBC CORRELATED TOPICS		
CFC CHAPTER/SECTION	**CBC CHAPTER/SECTION**	**SUBJECT**
Chapter 7	Chapter 7	Fire and smoke protection features (Fire-resistance-rated construction in the CBC)
Chapter 8	Chapter 8	Interior finish, decorative materials and furnishings
Chapter 9	Chapter 9	Fire protection and life safety systems
Chapter 10	Chapter 10	Means of egress
Section 1203	Chapter 27	Emergency and standby power
Chapter 31	Section 3103	Temporary structures
Chapter 33	Chapter 33	Construction fire safety
Chapters 50–67	Sections 307, 414, 415	Hazardous materials and Group H requirements

PART I—ADMINISTRATIVE

Chapter 1 Scope and Administration.

Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

Chapter 2 Definitions.

Chapter 2 is the repository of the definitions of terms used in the body of the code. The user of the code should be familiar with and consult this chapter because the definitions are essential to the correct interpretation of the code and because the user may not be aware that a term is defined.

PART II—GENERAL SAFETY PROVISIONS

Chapter 3 General Requirements

General regulations contained in Chapter 3, are intended to improve premises safety for everyone, including construction workers, tenants, operations and maintenance personnel, and emergency response personnel.

Chapter 4 Emergency Planning and Preparedness

Chapter 4 addresses the human contribution to life safety during emergencies. Continuous training and scheduled fire, evacuation and lockdown drills can be as important as the required periodic inspections and maintenance of built-in fire protection features. The level of preparation by the occupants also improves the emergency responders' abilities during an emergency.

PART III—BUILDING AND EQUIPMENT DESIGN FEATURES

Chapter 5 Fire Service Features

The requirements of Chapter 5 apply to all buildings and occupancies and pertain to access roads, access to building openings and roofs, premises identification, key boxes, fire protection water supplies, fire command centers, fire department access to equipment, and in-building emergency responder communication system coverage.

Chapter 6 Building Services and Systems

Chapter 6 provides a more systematic view of building systems and services as they relate to potential safety hazards and when and how they should be installed.

Chapter 7 Fire and Smoke Protection Features

The maintenance of assemblies required to be fire-resistance rated is a key component in a passive fire protection philosophy. Chapter 7 sets forth requirements to maintain required fire-resistance ratings of building elements and limit fire spread. Section 701 addresses the basics of what construction elements such as fire barriers and smoke barriers need to be maintained as well as defining the owner's responsibility. Sections 703 through 708, deals with various fire and smoke protection features that must also be maintained.

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Chapter 8 Interior Finish, Decorative Materials and Furnishings

The overall purpose of Chapter 8 is to regulate interior finishes, decorative materials and furnishings in new and existing buildings so that they do not significantly add to or create fire hazards within buildings. This chapter is consistent with Chapter 8 of the CBC, which regulates the interior finishes of new buildings.

Chapter 9 Fire Protection and Life Safety Systems

Chapter 9 prescribes the minimum requirements for active systems of fire protection equipment to perform the following functions: detect a fire, alert the occupants or fire department of a fire emergency, and control smoke and control or extinguish the fire. Generally, the requirements are based on the occupancy, the height and the area of the building because these are the factors that most affect firefighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the CBC; however, this chapter also contains periodic testing criteria that are not contained in the CBC. In addition, the special fire protection system requirements based on use and occupancy found in CBC Chapter 4 are duplicated in CFC Chapter 9 as a user convenience.

Chapter 10 Means of Egress

The criteria in Chapter 10 regulating the design of the means of egress system are established as the primary method for protection of occupants by allowing timely relocation or evacuation. Both prescriptive and performance language is utilized for determination of a safe exiting system. It addresses all portions of the means of egress system (i.e., exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7 of the CBC), interior finish (see Chapter 8 of the CBC), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Chapter 10 of the CBC is duplicated in Chapter 10 of the CFC; however, the CFC contains one additional section on the maintenance of the means of egress system in existing buildings.

Chapter 11 Construction Requirements for Existing Buildings

Chapter 11 applies to existing buildings constructed prior to the adoption of the code and intends to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing for retroactive requirements to install or upgrade fire safety features to such buildings that do not comply with the minimum requirements of the CBC. Prior to the 2009 edition, its content existed in the CFC but in a random manner that was neither efficient nor user-friendly. In the 2007/2008 International Code Council (ICC) code development cycle, a code change (F294-07/ 08) was approved that consolidated the retroactive elements of CFC into a single chapter for easier and more efficient reference and application to existing buildings.

Chapter 12 Energy Systems

Chapter 12 addresses any provisions related to energy systems found in the CFC. The expansion of such energy systems is related to meeting today's energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders. These requirements also facilitate the successful implementation of new technologies.

All text in Section 1207 of the 2024 CFC with the following designation (Material based on NFPA 855 2023 Ed.) is reproduced with permission from the National Fire Protection Association (NFPA) and is based upon NFPA 855, *Standard for the Installation of Stationary Energy Storage Systems*, Copyright © 2023 NFPA. All designated text is either directly copied from the 2023 edition of NFPA 855 or as modified by the ICC Code Development Process. This material is not the complete and official position of NFPA on the referenced subject, which is represented solely by the standard in its entirety. NFPA shall not be responsible for the manner in which this information is presented, nor for any interpretations thereof.

Chapters 13 through 19
Reserved for future use.

PART IV—SPECIAL OCCUPANCIES AND OPERATIONS

Chapter 20 Aviation Facilities

Chapter 20 specifies minimum requirements for the fire-safe operation of airports, heliports and helistops. The principal nonflight operational hazards associated with aviation involve fuel, facilities and operations. Therefore, safe use of flammable and combustible liquids during fueling and maintenance operations is emphasized. Availability of portable Class B:C-rated fire extinguishers for prompt control or suppression of incipient fires is required.

Chapter 21 Dry Cleaning

The provisions of Chapter 21 are intended to reduce hazards associated with the use of flammable and combustible dry cleaning solvents. These materials, like all volatile organic chemicals, generate significant quantities of static electricity and are thus readily ignitable. Many flammable and nonflammable dry cleaning solvents also create health hazards when involved in a fire.

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Chapter 22 Combustible Dust-Producing Operations

The requirements of Chapter 22 seek to reduce the likelihood of dust explosions by managing the hazards of ignitable suspensions of combustible dusts associated with a variety of operations, including woodworking, mining, food processing, agricultural commodity storage and handling, and pharmaceutical manufacturing, among others. Ignition source control and good housekeeping practices in occupancies containing dust-producing operations are emphasized.

Chapter 23 Motor Fuel-Dispensing Facilities and Repair Garages

Chapter 23 provides provisions that regulate the storage and dispensing of both liquid and gaseous motor fuels at public and private automotive, marine and aircraft motor fuel-dispensing facilities, and fleet vehicle motor fuel-dispensing facilities. In addition, this chapter addresses the various hazards created by the use of both liquid and gaseous fuels within repair garages.

Chapter 24 Flammable Finishes

Chapter 24 requirements govern operations where flammable or combustible finishes are applied by spraying, dipping, powder coating or flow-coating processes. As with all operations involving flammable or combustible liquids and combustible dusts or vapors, controlling ignition sources and methods of reducing or controlling flammable vapors or combustible dusts at or near these operations are emphasized.

Chapter 25 Fruit and Crop Ripening

Chapter 25 provides guidance that is intended to reduce the likelihood of explosions resulting from improper use or handling of ethylene gas used for crop ripening and coloring processes. This is accomplished by regulating ethylene gas generation, storage, and distribution systems and controlling ignition sources. Design and construction of facilities for this use are regulated by the CBC to reduce the impact of potential accidents on people and buildings.

Chapter 26 Fumigation and Insecticidal Fogging

Chapter 26 regulates fumigation and insecticidal fogging operations that use toxic pesticide chemicals to kill insects, rodents and other vermin. Fumigants and insecticidal fogging agents pose little hazard if properly applied; however, the inherent toxicity of all these agents and the potential flammability of some makes special precautions necessary when they are used.

Chapter 27 Semiconductor Fabrication Facilities

The requirements of Chapter 27 are intended to control hazards associated with the manufacture of electrical circuit boards or microchips, commonly called semiconductors. Materials commonly associated with semiconductor manufacturing are often quite hazardous and include flammable liquids, pyrophoric and flammable gases, toxic substances, and corrosives. The requirements of this chapter are concerned with both life safety and property protection. However, the fire code official should recognize that the risk of extraordinary property damages is far more common than the risk of personal injuries from fire.

Chapter 28 Lumber Yards and Agro-Industrial, Solid Biomass and Woodworking Facilities

Provisions of Chapter 28 are intended to prevent fires and explosions, facilitate fire control and reduce exposures to and from facilities storing, selling or processing wood and forest products. Also included are solid biomass feedstock and raw products associated with agro-industrial facilities, the outdoor storage of pallets, and manufacturing and recycling facilities. This chapter requires active and passive fire protection features to reduce on- and off-site exposures, limit fire size and development, and facilitate firefighting by employees and the fire service.

Chapter 29 Manufacture of Organic Coatings

Chapter 29 regulates materials and processes associated with the manufacture of paints as well as bituminous, asphaltic and other diverse compounds formulated to protect buildings, machines and objects from the effects of weather, corrosion and hostile environmental exposures. Painting and processes related to the manufacture of nonflammable and noncombustible or water-based products are exempt from the provisions of this chapter. The application of organic coatings is covered by Chapter 24.

Chapter 30 Industrial Ovens

Chapter 30 addresses the fuel supply, ventilation, emergency shutdown equipment, fire protection and the operation and maintenance of industrial ovens, which are sometimes referred to as industrial heat enclosures or industrial furnaces. Compliance with this chapter is intended to reduce the likelihood of fires involving industrial ovens, which are usually the result of the fuel in use or volatile vapors given off by the materials being heated, or to manage the impact if a fire should occur.

Chapter 31 Tents, Temporary Structures and Other Membrane Structures

The requirements in Chapter 31 are intended to protect temporary as well as permanent tents and air-supported and other membrane structures and temporary special event structures from fire and similar hazards. This chapter also addresses outdoor assembly events, which are not limited to those events where tents or other membrane structures are used but are regulated due to the number of people, density of those people and hazards associated with large outdoor events related to egress, fire hazards from cooking and other related concerns.

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Chapter 32 High-Piled Combustible Storage

Chapter 32 provides guidance for reasonable protection of life from hazards associated with the storage of combustible materials in closely packed piles or on pallets, in racks, or on shelves where the top of storage is greater than 12 feet in height. This chapter does not cover miscellaneous combustible materials storage regulated in Section 315.

Chapter 33 Fire Safety during Construction and Demolition

Chapter 33 outlines general fire safety precautions for all structures and all occupancies during construction and demolition operations. Most importantly, this chapter addresses owner responsibility and provides requirements for a site safety plan and requires a site safety director. This chapter is consistent with both Chapter 33 of the CBC and Chapter 15 of the CEBC.

Chapter 34 Tire Rebuilding and Tire Storage

The requirements of Chapter 34 are intended to prevent or control fires and explosions associated with the remanufacture and storage of tires and tire byproducts. Additionally, the requirements are intended to minimize the impact of indoor and outdoor tire storage fires by regulating pile volume and location, segregating the various operations, providing for fire department access and a water supply, and controlling ignition sources.

Chapter 35 Welding and Other Hot Work

Chapter 35 covers requirements for safety in welding and other types of hot work by reducing the potential for fire ignitions that often result in large losses. Several different types of hot work would fall under the requirements found in Chapter 35, including both gas and electric arc methods and any open-torch operations. Many of the activities of this chapter focus on the actions of the occupants.

Chapter 36 Marinas

Chapter 36 addresses the fire protection and prevention requirements for marinas. It was developed in response to the complications encountered by a number of fire departments responsible for the protection of marinas as well as fire loss history in marinas that lacked fire protection. Compliance with this chapter intends to establish safe practices in marina areas, provide an identification method for mooring spaces in the marina, and provide firefighters with safe operational areas and fire protection methods to extend hose lines in a safe manner.

Chapter 37 Combustible Fibers

Chapter 37 establishes the requirements for storage and handling of combustible fibers, including animal, vegetable and synthetic fibers, whether woven into textiles, baled, packaged or loose. Operations involving combustible fibers are typically associated with salvage, paper milling, recycling, cloth manufacturing, carpet and textile mills and agricultural operations, among others. The primary hazard associated with these operations is the abundance of materials and their ready ignitability.

Chapter 38 *Reserved*

Chapter 39 Processing and Extraction Facilities

Chapter 39 focuses on the plant processing, solvent based, and extraction of oils and fats from various plants, and cultivation and related activities. The processes used are not necessarily typical hazardous material processes and often the systems and equipment associated with such processes are not listed. This chapter provides the tools to appropriately enforce the CFC and provide an appropriate level of safety to meet the unique needs of the industry while providing the appropriate level of safety.

Chapter 40 Storage of Distilled Spirits and Wines

Chapter 40 provides specific requirements for the storage of distilled spirits and wines, including basic fire prevention requirements, fire protection features, storage configuration and signage. Additionally, in accordance with Section 307.1.1 of the CBC, these occupancies are not classified as a Group H occupancy. Instead, as listed in Sections 311.2 and 311.3 of the CBC, the storage of beverages that contain up to and including 20 percent alcohol are classified as a Group S-2 occupancy, and those that contain over 20 percent alcohol content are classified as a Group S-1 occupancy.

Chapter 41 Temporary Heating and Cooking Operations

Chapter 41 provides all requirements relative to temporary heating and cooking operations in a single chapter. Some of these provisions were originally found in Chapters 3, 6 and 31. This chapter is intended to facilitate consistent enforcement of temporary heating and cooking operations by making the requirements more straightforward. Temporary heating on construction sites is addressed in Chapter 33.

Chapters 42 through *47*
Reserved for future use.

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Chapter 48 Motion Picture and Television Production Studio Stages, Approved Production Facilities and Production Locations

On July 23, 1982, a Bell UH-1 Iroquois helicopter crashed at Indian Dunes in Valencia, Santa Clarita, California, during the making of Twilight Zone: The Movie. The crash killed three people on the ground and injured the six helicopter passengers. Those killed were actor Vic Morrow and child actors Myca Dinh Le and Renee Shin-Yi Chen. The incident led to years of civil and criminal action and was responsible for the introduction of new procedures and safety standards in the filmmaking industry.

Chapter 49 Requirements for Wildland-Urban Interface Fire Areas

Requirements for Wildland-Urban Interface Areas are now located in Part 7 of Title 24, California Wildland-Urban Interface Code. The provisions of Part 7, the California Wildland-Urban Interface Code shall apply to buildings and structures located in the wildland-urban interface (WUI) or Fire Hazard Severity Zone.

PART V—HAZARDOUS MATERIALS

Chapter 50 Hazardous Materials—General Provisions

Chapter 50 contains the general requirements for all hazardous chemicals in all occupancies. The general provisions of this chapter are intended to be companion provisions with the specific requirements of Chapters 51 through 67 regarding a given classification of hazardous material.

Chapter 51 Aerosols

Chapter 51 addresses the prevention, control and extinguishment of fires and explosions in facilities where retail aerosol products are displayed or stored. Requirements for storing aerosol products are dependent on the level of aerosol product, level of sprinkler protection, type of storage condition and quantity of aerosol products.

Chapter 52
Reserved for future use.

Chapter 53 Compressed Gases

Chapter 53 regulates the storage, use and handling of all flammable and nonflammable compressed gases, such as those that are used in medical facilities, air separation plants, industrial plants, agricultural equipment facilities and in systems such as carbon dioxide beverage dispensing and carbon dioxide enrichment. Where classified as a hazardous material, Chapter 50 would apply along with specific applications such as those used in welding and cutting (Chapter 35), cryogenic liquids (Chapter 55) and liquefied petroleum gases (Chapter 61).

Chapter 54 Corrosive Materials

Chapter 54 addresses materials whose primary hazard is corrosivity; that is, the ability to destroy or irreparably damage living tissue on contact. Although corrosive gases exist, most corrosive materials are solid or liquid and classified as either acids or bases (alkalis). These materials may pose a wide range of hazards other than corrosivity, such as combustibility, reactivity or oxidizing hazards, and must conform to the requirements of this code with respect to all known hazards.

Chapter 55 Cryogenic Fluids

Chapter 55 regulates the hazards associated with the storage, use and handling of cryogenic fluids through regulation of such things as pressure relief mechanisms and proper container storage. These hazards are in addition to the code requirements that address the other hazards of cryogenic fluids, such as flammability and toxicity (Chapters 50, 58 and 60).

Chapter 56 Explosives and Fireworks

Chapter 56 prescribes minimum requirements for the safe manufacture, storage, handling and use of explosives, ammunition and blasting agents for commercial and industrial occupancies. These provisions are intended to protect the general public, emergency responders and individuals who handle explosives. Chapter 56 also regulates the manufacturing, retail sale, display and wholesale distribution of fireworks.

Chapter 57 Flammable and Combustible Liquids

The requirements of Chapter 57 are intended to reduce the likelihood of fires involving the storage, handling, use or transportation of flammable and combustible liquids. The danger associated with flammable and combustible liquids is that the vapors from these liquids, when combined with air in their flammable range, will burn or explode at temperatures near normal living and working environment.

Chapter 58 Flammable Gases and Flammable Cryogenic Fluids

Chapter 58 sets requirements for the storage and use of flammable gases. For safety purposes, there is a limit on the quantities of flammable gas allowed per control area. Exceeding these limitations increases the possibility of damage to both property and indi-

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viduals. The principal hazard posed by flammable gas is its ready ignitability, or even explosivity, when mixed with air in the proper proportions. Consequently, occupancies storing or handling large quantities of flammable gas are classified as Group H- 2 (high hazard) by the CBC.

Chapter 59 Flammable Solids

Chapter 59 addresses general requirements for storage and handling of flammable solids, especially magnesium; however, it is important to note that several other solid materials, primarily metals, can be explosion hazards under the right conditions. Some of these metals are almost exclusively laboratory materials but because of where they are used, fire service personnel must be trained to handle emergency situations.

Chapter 60 Highly Toxic and Toxic Materials

The main purpose of Chapter 60 is to protect occupants, emergency responders and those in the immediate area of the building and facility from short-term, acute hazards associated with a release or general exposure to toxic and highly toxic materials. This chapter deals with all three states of toxic and highly toxic materials: solids, liquids and gases. This code does not address long-term exposure effects of these materials, which are addressed by agencies such as the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).

Chapter 61 Liquefied Petroleum Gases

Chapter 61 establishes requirements for the safe handling, storing and use of LP-gas to reduce the possibility of damage to containers, accidental releases of LP-gas and exposure of flammable concentrations of LP-gas to ignition sources. LP-gas (notably propane) is well known as a camping fuel for cooking, lighting, heating and refrigerating and also remains a popular standby fuel supply for auxiliary generators as well as being widely used as an alternative motor vehicle fuel.

Chapter 62 Organic Peroxides

Chapter 62 addresses the hazards associated with the storage, handling and use of organic peroxides and intends to prevent their uncontrolled release. These chemicals possess the characteristics of flammable or combustible liquids and are also strong oxidizers. The requirements of this chapter pertain to industrial applications in which significant quantities of organic peroxides are stored or used; however, smaller quantities of organic peroxides still pose a significant hazard and, therefore, must be stored and used in accordance with the applicable provisions of this chapter and Chapter 50.

Chapter 63 Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids

Chapter 63 addresses the hazards associated with solid, liquid, gaseous and cryogenic fluid oxidizing materials, including oxygen in home use, and establishes criteria for their safe storage and protection in indoor and outdoor storage facilities, minimizing the potential for uncontrolled releases and contact with fuel sources. Although oxidizers themselves do not burn, they pose unique fire hazards because of their ability to support combustion by breaking down and giving off oxygen.

Chapter 64 Pyrophoric Materials

Chapter 64 regulates the hazards associated with pyrophoric materials, which are capable of spontaneously igniting in the air at or below a temperature of 130°F (54°C). Many pyrophoric materials also pose severe flammability or reactivity hazards. This chapter addresses only the hazards associated with pyrophoric materials. Materials that pose multiple hazards must conform to the requirements of the code with respect to all hazards.

Chapter 65 Pyroxylin (Cellulose Nitrate) Plastics

Chapter 65 addresses the significant hazards associated with pyroxylin (cellulose nitrate) plastics, which are the most dangerous and unstable of all plastic compounds. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the hazards associated with pyroxylin (cellulose nitrate) plastics in a fire or other emergencies.

Chapter 66 Unstable (Reactive) Materials

Chapter 66 addresses the hazards of unstable (reactive) liquid and solid materials as well as unstable (reactive) compressed gases. Materials that pose multiple hazards, such as toxicity, corrosivity, explosivity, flammability or oxidizing potential, must conform to the requirements of the code with respect to all hazards. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, help reduce the exposure hazards associated with unstable (reactive) materials in a fire or other emergency.

Chapter 67 Water-Reactive Solids and Liquids

Chapter 67 addresses the hazards associated with water-reactive materials that are solid or liquid at normal temperatures and pressures. In addition to their water reactivity, these materials may pose a wide range of other hazards, such as toxicity, flammability, corrosiveness or oxidizing potential. Strict compliance with the requirements of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the exposure hazards associated with water-reactive materials in a fire or other emergency.

Chapters 68 through 79
Reserved for future use.

PART VI—REFERENCED STANDARDS

Chapter 80 Referenced Standards

Chapter 80 lists all of the product and installation standards and codes that are referenced throughout Chapters 1 through 67 and includes identification of the promulgators and the section numbers in which the standards and codes are referenced. As stated in Section 102.7, these standards and codes become an enforceable part of the code (to the prescribed extent of the reference) as if printed in the body of the code.

PART VII—APPENDICES

Appendix Chapter 4 Special Detailed Requirements Based on Use and Occupancy

Appendix Chapter 4 provides detailed criteria for special uses and occupancies. The unique characteristics of a live/work unit as opposed to a 30-story high-rise building call for specific standards for each. Twenty-seven sections address covered and open mall buildings, atriums, hospitals, stages, buildings where hazardous materials are used and stored, jails and prisons, ambulatory care facilities and storm shelters, among other special occupancy issues.

Appendix A Board of Appeals

Appendix A contains the provisions for appeal and the establishment of a board of appeals. The provisions include the application for an appeal, the makeup of the board of appeals and the conduct of the appeal process.

Appendix B Fire-Flow Requirements for Buildings

Appendix B provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with Section 507.3. The primary tool used in this appendix is a table that presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the CBC.

Appendix BB Fire-flow Requirements for Buildings

The procedures determining fire-flow requirements for any school buildings or portions of buildings hereafter constructed for which review and approval is required under Subdivision(a) of Section 17280 of the Government Code shall be in accordance with this appendix as amended by the state fire marshal.

Appendix C Fire Hydrant Locations and Distribution

Appendix C focuses on the location and spacing of fire hydrants, which is important to the success of firefighting operations. This particular appendix gives one methodology based on the required fire flow that fire departments can work with to set a policy for hydrant distribution around new buildings and facilities in conjunction with Section 507.5.

Appendix CC Fire Hydrant Locations and Distribution

Fire hydrants shall be provided in accordance with this appendix for the protection of any school buildings, or portions thereof, hereafter constructed for which review and approval are required under Subdivision(a) of Section 17280 of the Government Code.

Appendix D Fire Apparatus Access Roads

Appendix D contains more detailed elements for use with the basic access requirements found in Section 503. This appendix, like Appendices B and C, is a tool for jurisdictions looking for guidance in establishing access requirements and includes criteria for multiple-family residential developments, large one- and two-family subdivisions, specific examples for various types of turnarounds for fire department apparatus and parking regulatory signage.

Appendix E Hazard Categories

Appendix E contains guidance in the classifying of hazardous materials so that proposed designs can be evaluated intelligently and accurately. The descriptive materials and explanations of hazardous materials and how to report and evaluate them on a Safety Data Sheet (SDS) are intended to be instructional as well as informative.

Appendix F Hazard Ranking

The information in Appendix F is intended to be a companion to the specific requirements of Chapters 51 through 67, which regulate the storage, handling and use of all hazardous materials classified as either physical or health hazards. This appendix lists the various hazardous materials categories that are defined in this code, along with the NFPA 704 hazard ranking for each.

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Appendix G Cryogenic Fluids—Weight and Volume Equivalents

Appendix G gives the fire code official and design professional a ready reference tool for the conversion of the liquid weight and volume of cryogenic fluid to their corresponding volume of gas and vice versa and is a companion to the provisions of Chapter 55 of this code. Note that this appendix is for information purposes and is not intended for adoption.

Appendix H Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) Instructions

Appendix H is intended to assist businesses in establishing a Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) based on the classification and quantities of materials that would be found on-site, in storage or in use. The sample forms and available Safety Data Sheets (SDS) provide the basis for the evaluations. It is also a companion to CFC Sections 407.5 and 407.6, which provide the requirement that the HMIS and HMMP be submitted when required by the fire code official.

Appendix I Fire Protection Systems—Noncompliant Conditions

The purpose of Appendix I, which was developed by the ICC Hazard Abatement in Existing Buildings Committee, is to provide the fire code official with a list of conditions that are readily identifiable by the inspector during the course of an inspection utilizing the CFC. The specific conditions identified in this appendix are primarily derived from applicable NFPA standards and pose a hazard to the proper operation of the respective systems.

Appendix J Building Information Sign

Appendix J provides design, installation and maintenance requirements for a Building Information Sign (BIS), a fire service tool to be utilized in the crucial, initial response of firefighters to a structure fire. The BIS placard, which is in the shape of a fire service Maltese Cross, is designed to be utilized within the initial response time frame of an incident to assist firefighters in their tactical assessment of the construction type and hourly rating, fire protection systems, occupancy type, content hazards and special features that could affect tactical decisions and operations.

Appendix K Construction Requirements for Existing Ambulatory Care Facilities

Appendix K was created by the ICC Ad Hoc Committee on Healthcare (AHC) and is intended to provide jurisdictions with an option for assessing minimum fire and life safety requirements for buildings containing ambulatory care facilities. These requirements are presented as an appendix so that the adopting authority can exercise judgment in the adoption and application of this section since the ambulatory care facility requirements are fairly new to the codes. The technical requirements are based on the CBC language, which is consistent with the overall concept of the current federal requirements.

Appendix L Requirements for Firefighter Air Replenishment Systems

Appendix L provides for the design, installation and maintenance of permanently installed firefighter breathing air systems in buildings designated by the jurisdiction. The system has been called a “standpipe for air” and consists of stainless steel, high-pressure piping that is supplied by on-site air storage or fire department air supply units. Air-filling stations are then located throughout the building, allowing firefighters to refill breathing air cylinders inside the fire building.

Appendix M High-Rise Buildings—Retroactive Automatic Sprinkler Requirement

Appendix M was created with the intent to provide an option for adoption by jurisdictions that choose to require existing high-rise buildings to be retrofitted with automatic sprinklers.

Appendix N Indoor Trade Shows and Exhibitions

Appendix N was created to address the hazards associated with larger, more complex trade shows and exhibitions. Although many of these requirements are already included in various locations in this code, some of the more important items, such as requirements for covered booths and multiple-story booths, are not. The intent is to have the requirements covering these events in a single location. This assists those organizing exhibitions and individual exhibitors unfamiliar with the fire code.

Appendix O Valet Trash and Recycling Collection in Group R-2 Occupancies

Appendix O provides requirements to facilitate the enforcement of safety requirements for valet trash and recycling collection services in Group R-2 occupancies. These collection services are formally defined in Section 202 as “*Valet Trash Collection*,” which includes recycling. Occupants receiving this service place trash and recyclables in the corridor outside of their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

Appendix P Temporary Haunted Houses, Ghost Walks and Similar Amusement Uses

These regulations shall apply to temporary haunted houses, ghost walks or similar amusement uses, where decorative materials and confusing sounds and/or visual effects are present and shall be in accordance with this appendix.

Appendix Q Community Wildland-Urban Interface (WUI) Fire Hazard Evaluation Framework

Appendix Q is meant to be a tool to enable communities to collect, assemble and represent the associated risks within the Wildland-Urban Interface (WUI) fire area. Community-level fire hazard data is not always readily available in a centralized location and not in a standard format. This framework enables communities' leaders to collect their WUI fire hazard data in an immediately accessible format. This framework also allows the community WUI fire hazard area data to be an inclusive picture. Part of the data assembled in the framework layout will help first responders during an incident. This data may enhance situational awareness, facilitate ingress and egress routes, and increase structure survivability through targeted fire responder actions. The framework allows decision makers the ability to access WUI fire hazard risks across multiple communities when implemented in this standardized method. For example, a comparison can be made between a community of 5,000 residents to a community with 20,000 residents. They will be able to compare their overall fire hazard as well as the relative fire hazard. The information from the standardized framework may be used to assist with making the design and prioritizing resources at the community, county and state level. These resources may include funding for fuel treatment around communities in designated very high fire hazard severity zones. The proposed framework has the benefit of enabling communities, county and state to use a methodized approach to assess hazards, offer property solutions and inform first responders before and during incidents.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 1 – ADMINISTRATION

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below	X		X																				
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
Division I																							
1.1 – 1.1.12			X																				
1.11 – 1.11.11			X																				
[T-19 §1.11]				X																			
[T-19 §3.12]				X																			
[T-19 §1.08]				X																			
[T-19 §1.13]				X																			
[T-19 §1.03]				X																			
[T-19 §1.09.1]				X																			
Division II																							
102.1 – 102.5			X																				
102.7 – 102.12			X																				
102.13			X																				
104.2.3			X																				
104.3			X																				
104.6			X																				
104.8 – 104.8.1			X																				
105.1 – 105.2.2			X																				
105.2.4			X																				
105.3			X																				
105.3.1.1	X		X																				
105.3.3 – 105.5.9			X																				
Table 105.5.9			X																				
105.5.11 – 105.5.12			X																				
105.5.14 – 105.5.18			X																				
Table 105.5.22			X																				
105.5.23–105.5.25			X																				
105.5.27–105.5.29			X																				
105.5.31			X																				
105.5.40			X																				
105.5.42			X																				
105.5.44			X																				
105.5.51			X																				
105.5.53			X																				
105.5.58 – 105.5.59			X																				
105.6 – 105.6.1			X																				
105.6.3 – 105.6.25			X																				
109.2 – 109.4			X																				
113.1 – 113.3.1			X																				
114.1 – 114.4			X																				
115			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

1 ADMINISTRATION

DIVISION I
CALIFORNIA ADMINISTRATION

SECTION 1.1—GENERAL

1.1.1 Title. *These regulations shall be known as the California Fire Code, may be cited as such and will be referred to herein as "this code." The California Fire Code is Part 9 of thirteen parts of the official compilation and publication of the adoptions, amendment and repeal of building regulations to the California Code of Regulations, Title 24, also referred to as the California Building Standards Code. This part incorporates by adoption the 2024 International Fire Code of the International Code Council (ICC) with necessary California amendments.*

1.1.2 Purpose. *The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations.*

1.1.3 Scope. *The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout the State of California.*

This code establishes regulations affecting or relating to buildings, structures, processes, premises and a reasonable degree of life and property safeguards regarding:

1. *The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices.*
2. *Conditions hazardous to life, property or public welfare in the use or occupancy of buildings, structures or premises.*
3. *Fire hazards in the buildings, structures or on premises from use of, occupancy of, or operation.*
4. *Matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems.*
5. *Conditions affecting the safety of firefighters and emergency responders during emergency operations.*

1.1.3.1 Nonstate-regulated buildings, structures and applications. *Except as modified by local ordinance pursuant to Section 1.1.8, the following standards in the California Code of Regulations, Title 24, Parts 2, 3, 4, 5, 6, 7, 9, 10 and 11 shall apply to all occupancies and applications not regulated by a state agency.*

1.1.3.2 State-regulated buildings, structures and applications. *The model code, state amendments to the model code, and/or state amendments where there are no relevant model code provisions, shall apply to the following buildings, structures and applications regulated by state agencies as specified in Sections 1.2 through 1.14, except where modified by local ordinance pursuant to Section 1.1.8. When adopted by a state agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by the state legislature.*

Note: *See "How to Distinguish Between Model Code Language and California Amendments" following the Preface.*

1. *State-owned buildings, including buildings constructed by the Trustees of the California State University, and to the extent permitted by California laws, buildings designed and constructed by the Regents of the University of California, and regulated by the Building Standards Commission. See Section 1.2 for additional scope provisions.*
2. *Local detention facilities regulated by the Board of State and Community Corrections. See Section 1.3 for additional scope provisions.*
3. *Barbering, cosmetology or electrolysis establishments, acupuncture offices, pharmacies, veterinary facilities and structural pest control locations regulated by the Department of Consumer Affairs. See Section 1.4 for additional scope provisions.*
4. *Section 1.5 reserved for the California Energy Commission.*
5. *Dairies and places of meat inspection regulated by the Department of Food and Agriculture. See Section 1.6 for additional scope provisions.*
6. *Organized camps, laboratory animal quarters, public swimming pools, radiation protection, commissaries serving mobile food preparation vehicles and wild animal quarantine facilities regulated by the Department of Public Health. See Section 1.7 for additional scope provisions.*
7. *Hotels, motels, lodging houses, apartments, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilets or cooking facilities. See Section 1.8.2.1.1 for additional scope provisions.*
8. *Accommodations for persons with disabilities in buildings containing newly constructed covered multifamily dwellings, new common use spaces serving existing covered multifamily dwellings, additions to existing buildings where the addition alone meets the definition of a "COVERED MULTIFAMILY DWELLING," and new common-use areas serving new covered multifamily dwellings which are regulated by the Department of Housing and Community Development. See Section 1.8.2.1.2 for additional scope provisions.*

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9. *Permanent buildings and permanent accessory buildings or structures constructed within mobile home parks and special occupancy parks regulated by the Department of Housing and Community Development. See Section 1.8.2.1.3 for additional scope provisions.*
10. *Accommodations for persons with disabilities regulated by the Division of the State Architect. See Section 1.9.1 for additional scope provisions.*
11. *Public elementary and secondary schools, community college buildings and state-owned or state-leased essential service buildings regulated by the Division of the State Architect. See Section 1.9.2 for additional scope provisions.*
12. *Qualified historical buildings and structures and their associated sites regulated by the State Historical Building Safety Board with the Division of the State Architect.*
13. *General acute care hospitals, acute psychiatric hospitals, skilled nursing and/or intermediate care facilities, clinics licensed by the Department of Public Health and correctional treatment centers regulated by the Office of Statewide Hospital Planning and Development. See Section 1.10 for additional scope provisions.*
14. *Applications regulated by the Office of the State Fire Marshal include, but are not limited to, the following in accordance with Section 1.11:*
    - 14.1. *Buildings or structures used or intended for use as an:*
        1. *Asylum, jail, prison.*
        2. *Mental hospital, hospital, home for the elderly, children's nursery, children's home or institution, school or any similar occupancy of any capacity.*
        3. *Theater, dancehall, skating rink, auditorium, assembly hall, meeting hall, nightclub, fair building or similar place of assemblage where 50 or more persons may gather together in a building, room or structure for the purpose of amusement, entertainment, instruction, deliberation, worship, drinking or dining, awaiting transportation or education.*
        4. *Small family daycare homes, large family daycare homes, residential facilities and residential facilities for the elderly, residential care facilities.*
        5. *State institutions or other state-owned or state-occupied buildings.*
        6. *High-rise structures.*
        7. *Motion picture production studios.*
        8. *Organized camps.*
        9. *Residential structures.*
    - 14.2. *Tents, awnings or other fabric enclosures used in connection with any occupancy.*
    - 14.3. *Fire alarm devices, equipment and systems in connection with any occupancy.*
    - 14.4. *Hazardous materials, flammable and combustible liquids.*
    - 14.5. *Public school automatic fire detection, alarm and sprinkler systems.*
    - 14.6. *Wildland-urban interface fire areas.*
15. *Public libraries constructed and renovated using funds from the California Library Construction and Renovation Bond Act of 1988 and regulated by the State Librarian. See Section 1.12 of the California Building Code for additional scope provisions.*
16. *Section 1.13 reserved for the Department of Water Resources.*
17. *For applications listed in Section 1.9.1 regulated by the Division of the State Architect—Access Compliance, outdoor environments and uses shall be classified according to accessibility uses described in Chapters 11A, 11B and 11C.*
18. *Marine Oil Terminals regulated by the California State Lands Commission. See Section 1.14 of the California Building Code for additional scope provisions.*

1.1.4 Appendices. *Provisions contained in the appendices of this code shall not apply unless specifically adopted by a state agency or adopted by a local enforcing agency in compliance with Health and Safety Code, Section 18901 et. seq. for Building Standards Law, Health and Safety Code, Section 17950 for State Housing Law and Health and Safety Code, Section 13869.7 for Fire Protection Districts. See Section 1.1.8 of this code.*

1.1.5 Referenced codes. *The codes, standards and publications adopted and set forth in this code, including other codes, standards and publications referred to therein are, by title and date of publication, hereby adopted as standard reference documents of this code. When this code does not specifically cover any subject related to building design and construction, recognized architectural or engineering practices shall be employed. The National Fire Codes, standards and the Fire Protection Handbook of the National Fire Protection Association are permitted to be used as authoritative guides in determining recognized fire prevention engineering practices.*

1.1.6 Nonbuilding standards, orders and regulations. *Requirements contained in the California Fire Code, or in any other referenced standard, code or document, which are not building standards as defined in Health and Safety Code, Section 18909 shall not be construed as part of the provisions of this code. For nonbuilding standards, orders and regulations, see other titles of the California Code of Regulations.*

1.1.7 Order of precedence and use.

1.1.7.1 Differences. *In the event of any differences between these building standards and the standard reference documents, the text of these building standards shall govern.*

1.1.7.2 Specific provisions. *Where a specific provision varies from a general provision, the specific provision shall apply.*

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1.1.7.3 Conflicts. *When the requirements of this code conflict with the requirements of any other part of the California Building Standards Code, Title 24, the most restrictive requirements shall prevail.*

1.1.7.3.1. *Detached one- and two-family dwellings, efficiency dwelling units, lodging houses, live/work units, townhouses not more than three stories above grade plane with a separate means of egress, and their accessory structures, may be designed and constructed in accordance with the California Building Code or the California Residential Code, but not both, unless the proposed structure(s) or element(s) exceed the design limitations established in the California Residential Code, and the code user is specially directed by the California Residential Code to use the California Building Code.*

1.1.8 City, county or city and county amendments, additions or deletions. *The provisions of this code do not limit the authority of city, county or city and county governments to establish more restrictive and reasonably necessary differences to the provisions contained in this code pursuant to complying with Section 1.1.8.1. The effective date of amendments, additions or deletions to this code of a city, county or a city and county filed pursuant to Section 1.1.8.1 shall be the date filed. However, in no case shall the amendments, additions or deletions to this code be effective any sooner than the effective date of this code.*

Local modifications shall comply with Health and Safety Code, Section 18941.5 for Building Standards Law, Health and Safety Code, Section 17958 for State Housing Law or Health and Safety Code, Section 13869.7 for Fire Protection Districts.

1.1.8.1 Findings and filings.

1. *The city, county or city and county shall make express findings for each amendment, addition or deletion based upon climatic, topographical or geological conditions.*

   Exception: *Hazardous building ordinances and programs mitigating unreinforced masonry buildings.*
2. *The city, county or city and county shall file the amendments, additions or deletions expressly marked and identified as to the applicable findings. Cities, counties, cities and counties and fire departments shall file the amendments, additions or deletions, and the findings with the California Building Standards Commission at 2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833.*
3. *Findings prepared by fire protection districts shall be ratified by the local city, county or city and county and filed with the California Department of Housing and Community Development, Division of Codes and Standards, P.O. Box 1407, Sacramento, CA 95812-1407 or 2020 West El Camino Avenue, Suite 250, Sacramento, CA 95833-1829.*

1.1.8.2 Locally adopted energy standards—California Energy Code, Part 6

In addition to the provisions of Section 1.1.8.1 of this Part, the provisions of this section apply to cities, counties and city and county amending adopted energy standards affecting buildings and structures subject to the California Energy Code, Part 6.

Applicable provisions of Public Resources Code Section 25402.1 and applicable provisions of Chapter 10 of the California Administrative Code, Part 1 apply to local amendment of energy standards adopted by the California Energy Commission.

1.1.9 Effective date of this code. *Only those standards approved by the California Building Standards Commission that are effective at the time an application for building permit is submitted shall apply to the plans and specifications for, and to the construction performed under, that permit. For the effective dates of the provisions contained in this code, see the History Note page of this code.*

1.1.10 Availability of codes. *At least one complete copy each of Titles 8, 19, 20, 24 and 25 with all revisions shall be maintained in the office of the building official responsible for the administration and enforcement of this code. Each state department concerned and each city, county or city and county shall have an up-to-date copy of the code available for public inspection. See Health and Safety Code, Section 18942(e)(1) and (2).*

1.1.11 Format. *This part fundamentally adopts the California Fire Code by reference on a chapter-by-chapter basis. When a specific chapter of the California Fire Code is not printed in the code and is marked "Reserved," such chapter of the California Fire Code is not adopted as a portion of this code. When a specific chapter of the California Fire Code is marked "Not adopted by the State of California," but appears in the code, it may be available for adoption by local ordinance.*

Note: *Matrix Adoption Tables at the front of each chapter may aid the code user in determining which chapter or sections within a chapter are applicable to buildings under the authority of a specific state agency, but they are not to be considered regulatory.*

1.1.12 Validity. *If any chapter, section, subsection, sentence, clause or phrase of this code is for any reason held to be unconstitutional, contrary to statute, exceeding the authority of the state as stipulated by statutes or otherwise inoperative, such decision shall not affect the validity of the remaining portion of this code.*

SECTION 1.11—OFFICE OF THE STATE FIRE MARSHAL

1.11.1 SFM—Office of the State Fire Marshal. *Specific scope of application of the agency responsible for enforcement, the enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.*

Application:

Institutional, educational or any similar occupancy. *Any building or structure used or intended for use as an asylum, jail, prison, mental hospital, hospital, sanitarium, home for the elderly, children's nursery, children's home or institution, school or any similar occupancy of any capacity.*

Authority cited—*Health and Safety Code, Section 13143.*
Reference—*Health and Safety Code, Section 13143.*

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Assembly or similar place of assemblage. *Any theater, dancehall, skating rink, auditorium, assembly hall, meeting hall, nightclub, fair building or similar place of assemblage where 50 or more persons may gather together in a building, room or structure for the purpose of amusement, entertainment, instruction, deliberation, worship, drinking or dining, awaiting transportation or education.*

Authority cited—*Health and Safety Code, Section 13143.*
Reference—*Health and Safety Code, Section 13143.*

Small family daycare homes.

Authority cited—*Health and Safety Code, Sections 1597.45, 1597.54, 13143 and 17921.*
Reference—*Health and Safety Code, Section 13143.*

Large family daycare homes.

Authority cited—*Health and Safety Code, Sections 1597.46, 1597.54 and 17921.*
Reference—*Health and Safety Code, Section 13143.*

Residential facilities and residential facilities for the elderly.

Authority cited—*Health and Safety Code, Section 13133.*
Reference—*Health and Safety Code, Section 13143.*

Any state institution or other state-owned or specified state-occupied building.

Specified state-occupied buildings. *Any building, structure or area that meets any of the following criteria:*

1. *A building where the state has contracted into a build-to-suit lease.*
2. *A courthouse holding facility or trial court with a detention area.*
3. *A building used by the Department of Corrections and Rehabilitation (CDCR) as a community correctional reentry center.*
4. *100 percent state occupied.*
5. *State-occupied areas in a state-leased building that is a high-rise and is 75 percent of the net area floor space or more occupied by state entities.*
6. *State-occupied areas in a building that contains 5,000 square feet or more space of state-leased Group H or Group L occupancy.*
7. *A state-leased building with facilities with the primary purpose of housing state records and/or state artifacts of historical significance.*
8. *Properties leased by California State University (CSU).*
9. *State institutions and their real property.*
10. *CAL FIRE occupied areas in leased buildings.*
11. *State-leased facilities where the governing body's fire protection services rely on an all-volunteer fire department.*

Authority cited—*Health and Safety Code, Sections 13108, 13145, 13146, 16022.5 and 17921.*
Reference—*Health and Safety Code, Sections 13108, 13143, 13145, 13146, 16022.5 and 17921.*

High-rise structures.

Authority cited—*Health and Safety Code, Section 13211.*
Reference—*Health and Safety Code, Section 13143.*

Motion picture production studios.

Authority cited—*Health and Safety Code, Section 13143.1.*
Reference—*Health and Safety Code, Section 13143.*

Organized camps.

Authority cited—*Health and Safety Code, Section 18897.3.*
Reference—*Health and Safety Code, Section 13143.*

Residential. *All hotels, motels, lodging houses, apartment houses and dwellings, including congregate residences and buildings and structures accessory thereto. Multiple-story structures existing on January 1, 1975, let for human habitation, including and limited to, hotels, motels and apartment houses, less than 75 feet (22 860 mm) above the lowest floor level having building access, wherein rooms used for sleeping are let above the ground floor.*

Authority cited—*Health and Safety Code, Sections 13143.2 and 17921.*
Reference—*Health and Safety Code, Section 13143.*

Residential care facilities. *Certified family care homes, out-of-home placement facilities, halfway houses, drug and/or alcohol rehabilitation facilities and any building or structure used or intended for use as a home or institution for the housing of any person of any age when such person is referred to or placed within such home or institution for protective social care and supervision services by any governmental agency.*

Authority cited—*Health and Safety Code, Section 13143.6.*
Reference—*Health and Safety Code, Section 13143.*

Tents, awnings or other fabric enclosures used in connection with any occupancy.

Authority cited—*Health and Safety Code, Section 13116.*
Reference—*Health and Safety Code, Section 13143.*

Fire alarm devices, equipment and systems in connection with any occupancy.

Authority cited—*Health and Safety Code, Section 13114.*
Reference—*Health and Safety Code, Section 13143.*

Hazardous materials.

Authority cited—*Health and Safety Code, Section 13143.9.*
Reference—*Health and Safety Code, Section 13143.*

Flammable and combustible liquids.

Authority cited—*Health and Safety Code, Section 13143.6.*
Reference—*Health and Safety Code, Section 13143.*

Public school automatic fire detection, alarm and sprinkler systems.

Authority cited—*Health and Safety Code, Section 13143 and California Education Code, Article 7.5, Sections 17074.50, 17074.52 and 17074.54.*
Reference—*Government Code, Section 11152.5, Health and Safety Code, Section 13143 and California Education Code Chapter 12.5, Leroy F. Greene School Facilities Act of 1998, Article 1.*

Wildland-urban interface Fire Area.

Authority cited—*Health and Safety Code, Sections 13143, 13108.5(a) and 18949.2(b) and (c) and Government Code, Section 51189.*
Reference—*Health and Safety Code, Sections 13143, Government Code, Sections 51176, 51177, 51178 and 51179 and Public Resources Code, Sections 4201 through 4204.*

1.11.1.1 Adopting agency identification. *The provisions of this code applicable to buildings identified in this Subsection 1.11.1 will be identified in the Matrix Adoption Tables under the acronym SFM.*

1.11.2 Duties and powers of the enforcing agency.

1.11.2.1 Enforcement.

1.11.2.1.1 *The responsibility for enforcement of building standards adopted by the State Fire Marshal and published in the California Building Standards Code relating to fire and panic safety and other regulations of the State Fire Marshal shall be, except as provided in Section 1.11.2.1.2, as follows:*

1. *The city, county or city and county with jurisdiction in the area affected by the standard or regulation shall delegate the enforcement of the building standards relating to fire and panic safety and other regulations of the State Fire Marshal as they relate to Group R-3 occupancies, as described in Section 310.1 of Part 2 of the California Building Standards Code, to either of the following:*
    1.1. *The chief of the fire authority of the city, county or city and county or an authorized representative.*
    1.2. *The chief building official of the city, county or city and county or an authorized representative.*
2. *The chief of any city or county fire department or of any fire protection district, and authorized representatives, shall enforce within the jurisdiction the building standards and other regulations of the State Fire Marshal, except those described in Item 1 or 4.*
3. *The State Fire Marshal shall have authority to enforce the building standards and other regulations of the State Fire Marshal in areas outside of corporate cities and districts providing fire protection services.*
4. *The State Fire Marshal shall have authority to enforce the building standards and other regulations of the State Fire Marshal in corporate cities and districts providing fire protection services on request of the chief fire official or the governing body.*
5. *Any fee charged pursuant to the enforcement authority of this section shall not exceed the estimated reasonable cost of providing the service for which the fee is charged pursuant to Section 66014 of the Government Code.*

[California Code of Regulations, Title 19, Division 1, §1.11] Enforcement of Regulations.

In most instances, the application of California Code of Regulations, Title 19, Division 1 to existing occupancies will necessitate the granting of sufficient time to affect the necessary changes. The inspection authority must, therefore, exercise good judgment in authorizing sufficient time to complete the required changes, taking into consideration the degree of danger to life in event of fire while rectification is being carried out. The inspection authority may require immediate compliance with any or all of the regulations, or he may grant a reasonable length of time in which to conform.

[California Code of Regulations, Title 19, Division 1, §3.12] Enforcement Agency.

(a) The provisions of California Code of Regulations, Title 19, Division 1 regulations shall be enforced by the State Fire Marshal, the chief of any city or county fire department or fire protection district, and their authorized representatives, in their respective areas of jurisdiction.

(b) The division of authority for the enforcement of these regulations shall be in accordance with the following:
    (1) The chief of any city or county fire department or fire protection district, and their authorized representatives shall enforce the rules and regulations in their respective areas.
    (2) The State Fire Marshal shall have authority to enforce the rules and regulations in areas outside of corporate cities and county fire protection districts.

(3) *The State Fire Marshal shall have authority to enforce the rules and regulations in corporate cities and county fire protection districts upon request of the chief fire official or the governing body.*

(c) *Regardless of the provisions of subsections (a) and (b) above, these regulations shall be enforced in state institutions, state-owned and state-occupied buildings in accordance with the provisions of Section 13108, Health and Safety Code.*

(d) *Regardless of the above provisions of this section, these regulations shall be enforced only by the State Fire Marshal in every jail or place of detention for persons charged with or convicted of a crime, unless the chief of a city or county fire department or fire protection district, or such chief's authorized representative, indicates in writing to the State Fire Marshal that inspections of such jails or places of detention will be conducted by the chief or such person's authorized representative, in their respective area of jurisdiction. The inspections shall be made at least once every two years for the purpose of enforcing the regulations adopted by the State Fire Marshal, pursuant to Section 13143. Reports of inspection conducted pursuant to this subsection shall be on forms provided by the State Fire Marshal and shall be submitted to the official in charge of the facility, the local governing body, the State Fire Marshal and the Corrections Standards Authority within 30 days of the inspections.*

1.11.2.1.2 *Pursuant to Health and Safety Code, Section 13108, and except as otherwise provided in this section, building standards adopted by the State Fire Marshal published in the California Building Standards Code relating to fire and panic safety shall be enforced by the State Fire Marshal in all state-owned buildings, state-occupied buildings and state institutions throughout the state. Upon the written request of the chief fire official of any city, county or fire protection district, the State Fire Marshal may authorize such chief fire official and his or her authorized representatives, in their geographical area of responsibility, to make fire prevention inspections of state-owned or state-occupied buildings, other than state institutions, for the purpose of enforcing the regulations relating to fire and panic safety adopted by the State Fire Marshal pursuant to this section and building standards relating to fire and panic safety published in the California Building Standards Code. Authorization from the State Fire Marshal shall be limited to those fire departments or fire districts which maintain a fire prevention bureau staffed by paid personnel.*

Pursuant to Health and Safety Code, Section 13108, any requirement or order made by any chief fire official who is authorized by the State Fire Marshal to make fire prevention inspections of state-owned or state-occupied buildings, other than state institutions, may be appealed to the State Fire Marshal. The State Fire Marshal shall, upon receiving an appeal and subject to the provisions of Chapter 5 (commencing with Section 18945) of Part 2.5 of Division 13 of the Health and Safety Code, determine if the requirement or order made is reasonably consistent with the fire and panic safety regulations adopted by the State Fire Marshal and building standards relating to fire and panic safety published in the California Building Code.

Any person may request a code interpretation from the State Fire Marshal relative to the intent of any regulation or provision adopted by the State Fire Marshal. When the request relates to a specific project, occupancy or building, the State Fire Marshal shall review the issue with the appropriate local enforcing agency prior to rendering such code interpretation.

1.11.2.1.3 *Pursuant to Health and Safety Code, Section 13112, any person who violates any order, rule or regulation of the State Fire Marshal is guilty of a misdemeanor punishable by a fine of not less than $100.00 or more than $500.00, or by imprisonment for not less than six months, or by both. A person is guilty of a separate offense each day during which he or she commits, continues or permits a violation of any provision of, or any order, rule or regulation of, the State Fire Marshal as contained in this code.*

Any inspection authority who, in the exercise of his or her authority as a deputy State Fire Marshal, causes any legal complaints to be filed or any arrest to be made shall notify the State Fire Marshal immediately following such action.

1.11.2.2 Right of entry. *The fire chief of any city, county or fire protection district, or such person's authorized representative, may enter any state institution or any other state-owned or state-occupied building for the purpose of preparing a fire suppression preplanning program or for the purpose of investigating any fire in a state-occupied building.*

The State Fire Marshal, his or her deputies or salaried assistants, the chief of any city or county fire department or fire protection district and his or her authorized representatives may enter any building or premises not used for dwelling purposes at any reasonable hour for the purpose of enforcing this chapter. The owner, lessee, manager or operator of any such building or premises shall permit the State Fire Marshal, his or her deputies or salaried assistants and the chief of any city or county fire department or fire protection district and his or her authorized representatives to enter and inspect them at the time and for the purpose stated in this section.

[California Code of Regulations, Title 19, Division 1, §1.08] Report of Arrest.

Any inspection authority who, in the exercise of his authority as a Deputy State Fire Marshal, causes any legal complaints to be filed or any arrest to be made shall notify the State Fire Marshal immediately following such action.

[California Code of Regulations, Title 19, Division 1, §1.13] Penalty.

Section 13112 of the Health and Safety Code provides that:

(a) *"Every person who violates any provision of this chapter, or any order, rule or regulation made pursuant to this chapter is guilty of a misdemeanor punishable by a fine of not less than one hundred dollars ($100) or more than five hundred dollars ($500), or by imprisonment for not more than six months, or by both."*

(b) *"A person is guilty of a separate offense each day during which he commits, continues or permits a violation of any provision of, or any order, rule or regulation made pursuant to, this chapter."*

1.11.2.3 More restrictive fire and panic safety building standards.

1.11.2.3.1 *Any fire protection district organized pursuant to Health and Safety Code Part 2.7 (commencing with Section 13800) of Division 12 may adopt building standards relating to fire and panic safety that are more stringent than those building standards adopted by the State Fire Marshal and contained in the California Building Standards Code. For these purposes, the district board shall be deemed a legislative body and the district shall be deemed a local agency. Any changes or modifications that are more*

stringent than the requirements published in the California Building Standards Code relating to fire and panic safety shall be subject to Section 1.1.8.1.

1.11.2.3.2 *Any fire protection district that proposes to adopt an ordinance pursuant to this section shall, not less than 30 days prior to noticing a proposed ordinance for public hearing, provide a copy of that ordinance, together with the adopted findings made pursuant to Section 1.11.2.3.1, to the city, county or city and county where the ordinance will apply. The city, county or city and county may provide the district with written comments, which shall become part of the fire protection district's public hearing record.*

1.11.2.3.3 *The fire protection district shall transmit the adopted ordinance to the city, county or city and county where the ordinance will apply. The legislative body of the city, county or city and county may ratify, modify or deny an adopted ordinance and transmit its determination to the district within 15 days of the determination. Any modification or denial of an adopted ordinance shall include a written statement describing the reasons for any modifications or denial. No ordinance adopted by the district shall be effective until ratification by the city, county or city and county where the ordinance will apply. Upon ratification of an adopted ordinance, the city, county or city and county shall file a copy of the findings of the district, and any findings of the city, county or city and county, together with the adopted ordinance expressly marked and identified to which each finding refers, in accordance with Section 1.1.8.1(3).*

1.11.2.4 Request for alternate means of protection. *Requests for approval to use an alternative material, assembly or materials, equipment, method of construction, method of installation of equipment or means of protection shall be made in writing to the enforcing agency by the owner or the owner's authorized representative and shall be accompanied by a full statement of the conditions. Sufficient evidence or proof shall be submitted to substantiate any claim that may be made regarding its conformance. The enforcing agency may require tests and the submission of a test report from an approved testing organization as set forth in California Code of Regulations, Title 19, to substantiate the equivalency of the proposed alternative means of protection.*

When a request for alternate means of protection involves hazardous materials, the authority having jurisdiction may consider implementation of the findings and recommendations identified in a Risk Management Plan (RMP) developed in accordance with Title 19, Division 5, Chapter 2 Article 3.

Approval of a request for use of an alternative material, assembly of materials, equipment, method of construction, method of installation of equipment or means of protection made pursuant to these provisions shall be limited to the particular case covered by request and shall not be construed as establishing any precedent for any future request.

1.11.2.5 Appeals. *When a request for an alternate means of protection has been denied by the enforcing agency, the applicant may file a written appeal to the State Fire Marshal for consideration of the applicant's proposal. In considering such appeal, the State Fire Marshal may seek the advice of the State Board of Fire Services. The State Fire Marshal shall, after considering all of the facts presented, including any recommendations of the State Board of Fire Services, determine if the proposal is for the purposes intended, at least equivalent to that specified in these regulations in quality, strength, effectiveness, fire resistance, durability and safety, and shall transmit such findings and any recommendations to the applicant and to the enforcing agency.*

1.11.3 Construction documents.

1.11.3.1 Public schools. *Plans and specifications for the construction, alteration or addition to any building owned, leased or rented by any public school district shall be submitted to the Division of the State Architect.*

1.11.3.2 Movable walls and partitions. *Plans or diagrams shall be submitted to the enforcing agency for approval before the installation of, or rearrangement of, any movable wall or partition in any occupancy. Approval shall be granted only if there is no increase in the fire hazard.*

1.11.3.3 New construction high-rise buildings.

1. *Complete plans or specifications, or both, shall be prepared covering all work required to comply with new construction high-rise buildings. Such plans and specifications shall be submitted to the enforcing agency having jurisdiction.*
2. *All plans and specifications shall be prepared under the responsible charge of an architect or a civil or structural engineer authorized by law to develop construction plans and specifications, or by both such architect and engineer. Plans and specifications shall be prepared by an engineer duly qualified in that branch of engineering necessary to perform such services. Administration of the work of construction shall be under the charge of the responsible architect or engineer except that where plans and specifications involve alterations or repairs, such work of construction may be administered by an engineer duly qualified to perform such services and holding a valid certificate under Chapter 7 (commencing with Section 65700) of Division 3 of the Business and Professions Code for performance of services in that branch of engineering in which said plans, specifications and estimates and work of construction are applicable.*

This section shall not be construed as preventing the design of fire-extinguishing systems by persons holding a C-16 license issued pursuant to Division 3, Chapter 9, Business and Professions Code. In such instances, however, the responsibility charge of this section shall prevail.

1.11.3.4 Existing high-rise buildings.

1. *Complete plans or specifications, or both, shall be prepared covering all work required by Chapter 11 and California Existing Building Code for existing high-rise buildings. Such plans or specifications shall be submitted to the enforcing agency having jurisdiction.*
2. *When new construction is required to conform with the provisions of these regulations, complete plans or specifications, or both, shall be prepared in accordance with the provisions of this subsection. As used in this section, "new construction" is*

not intended to include repairs, replacements or minor alterations which do not disrupt or appreciably add to or affect the structural aspects of the building.

1.11.3.5 Retention of plans. *Refer to Building Standards Law, Health and Safety Code, Sections 19850 and 19851 for permanent retention of plans.*

1.11.4 Fees.

1.11.4.1 Other fees. *Pursuant to Health and Safety Code, Section 13146.2, a city, county or district which inspects a hotel, motel, lodging house or apartment house may charge and collect a fee for the inspection from the owner of the structure in an amount, as determined by the city, county or district, sufficient to pay its costs of that inspection.*

1.11.4.2 Large family daycare. *Pursuant to Health and Safety Code, Section 1597.46, Large Family Day-Care Homes, the local government shall process any required permit as economically as possible, and fees charged for review shall not exceed the costs of the review and permit process.*

1.11.4.3 High-rise. *Pursuant to Health and Safety Code, Section 13217, High-rise Structure Inspection: Fees and Costs, a local agency which inspects a high-rise structure pursuant to Health and Safety Code Section 13217 may charge and collect a fee for the inspection from the owner of the high-rise structure in an amount, as determined by the local agency, sufficient to pay its costs of that inspection.*

1.11.4.4 Fire clearance pre-inspection. *Pursuant to Health and Safety Code, Section 13235, Fire Clearance Pre-inspection, fee, upon receipt of a request from a prospective licensee of a community care facility, as defined in Section 1502, of a residential care facility for the elderly, as defined in Section 1569.2, or of a child daycare facility, as defined in Section 1596.750, the local fire enforcing agency, as defined in Sections 13145 and 13146, or State Fire Marshal, whichever has primary jurisdiction, shall conduct a pre-inspection of the facility prior to the final fire clearance approval. At the time of the preinspection, the primary fire enforcing agency shall price consultation and interpretation of the fire safety regulations and shall notify the prospective licensee of the facility in writing of the specific fire safety regulations which shall be enforced in order to obtain fire clearance approval. A fee equal to, but not exceeding, the actual cost of the pre-inspection may be charged for the pre-inspection of a facility.*

1.11.4.5 Care facilities. *The primary fire enforcing agency shall complete the final fire clearance inspection for a community care facility, residential care facility for the elderly or child day-care facility within 30 days of receipt of the request for the final inspection, or as of the date the prospective facility requests the final prelicensure inspection by the State Department of Social Services, whichever is later.*

Pursuant to Health and Safety Code, Section 13235, a pre-inspection fee equal to, but not exceeding, the actual cost of the pre-inspection services may be charged for the pre-inspection of a facility.

Pursuant to Health and Safety Code, Section 13131.5, a reasonable final inspection fee, not to exceed the actual cost of inspection services necessary to complete a final inspection may be charged for occupancies classified as residential care facilities for the elderly (RCFE).

Pursuant to Health and Safety Code, Section 1569.84, neither the State Fire Marshal nor any local public entity shall charge any fee for enforcing fire inspection regulations pursuant to state law or regulation or local ordinance, with respect to residential care facilities for the elderly (RCFE) which service six or fewer persons.

1.11.4.6 Requests of the Office of the State Fire Marshal. *Whenever a local authority having jurisdiction requests that the State Fire Marshal perform plan review and/or inspection services related to a building permit, the applicable fees for such shall be payable to the Office of the State Fire Marshal.*

1.11.5 Inspections. *Work performed subject to the provisions of this Code shall comply with the inspection requirements contained in Section 107, as adopted by the Office of the State Fire Marshal.*

1.11.5.1 Existing Group R occupancies. *Licensed 24-hour care in a Group R occupancy in existence and originally classified under previously adopted state codes shall be reinspected under the appropriate previous code, provided there is no change in the use or character which would place the facility in a different occupancy group.*

1.11.6 Certificate of Occupancy. *A Certificate of Occupancy shall be issued as specified in Title 24, Part 2, California Building Code, Section 111.*

Exception: *Certificates of occupancy are not required for work exempt from permits in accordance with Section 105.2 of the California Building Code.*

1.11.7 Temporary Structures and Uses. *See Title 24, Part 2, California Building Code, Section 108.*

1.11.8 Service Utilities. *See Title 24, Part 2, California Building Code, Section 112.*

1.11.9 Stop Work Order. *See Title 24, Part 2, California Building Code, Section 115.*

1.11.10 Unsafe Buildings, Structures and Equipment. *See Title 24, Part 2, California Building Code, Section 116.*

[California Code of Regulations, Title 19, Division 1, §1.03] Scope.

(a) California Code of Regulations, Title 19, Division 1 regulations shall govern the use and maintenance of any building or structure used or intended for use as an asylum, jail, mental hospital, hospital, sanitarium, home for aged, children's home or institution, school or any similar occupancy of any capacity; and any theater, dance hall, skating rink, auditorium, assembly hall, meeting hall, night club, fair building or similar place of assemblage where 50 or more persons may gather together in a building, room or structure for the purpose of amusement, entertainment, instruction, deliberation, worship, drinking or

dining, awaiting transportation or education, and in any building or structure which is open to the public and is used or intended to be used for the showing of motion pictures when an admission fee is charged and when such building or structure has a capacity of 10 or more persons, and shall apply to both new and existing occupancies.

Exceptions:

(1) Buildings controlled by the Federal Government, provided they are not subject to the provisions of Section 15452, Education Code.

(2) Homes and institutions and day-care facilities which provide nonmedical board, room and care for six or fewer ambulatory children.

California Code of Regulations, Title 19, Division 1 regulations shall also apply to any building housing any occupancy when such building is used as an auxiliary or accessory structure to any of the occupancies specified herein. They do not apply to structural requirements not relating to fire and panic safety nor to matters dealing exclusively with health and sanitation.

(b) In accordance with Section 13108 of the Health and Safety Code, California Code of Regulations, Title 19, Division 1 regulations shall govern the design and construction relating to fire protection in any state institution and in any state-owned or state-occupied building. For purposes of California Code of Regulations, Title 19, Division 1 regulations, "state-occupied buildings" are defined as those portions of a building which are leased or rented by the state and shall include all required exits leading therefrom to a public way. Portions of state-occupied buildings which are not leased or rented by the state shall not fall within the scope of this subsection unless such portions present an exposure hazard to the state-occupied area.

(c) California Code of Regulations, Title 19, Division 1 regulations shall also govern the use and maintenance of "organized camps" as defined in Section 18897, Health and Safety Code.

(d) California Code of Regulations, Title 19, Division 1 regulations shall also govern the use and maintenance of any building or structure used or intended for the housing of any person of any age when such person is referred to or placed within such home or facility for protective social care and supervision services by any governmental agency.

(e) California Code of Regulations, Title 19, Division 1 regulations shall also govern the construction, use and maintenance of every building of any type of construction or occupancy having floors used for human occupancy located more than 75 feet above the lowest floor level having building access. For the purpose of this subsection, "building access" shall mean an exterior door opening conforming to all of the following:

(1) Suitable and available for fire department use.

(2) Located not more than 2 feet above the adjacent ground level.

(3) Leading to a space, room or area having foot traffic communication capabilities with the remainder of the building.

(4) Designed to permit penetration through the use of fire department forcible entry tools and equipment unless other approved arrangements have been made with the fire authority having jurisdiction.

(f) California Code of Regulations, Title 19, Division 1 regulations shall also apply to vehicles, ships and boats or other mobile structures when fixed in a specific location and used for any occupancy within the scope of this section.

***Note:** Unless otherwise specified, Title 19 applies to all building occupancies, and related features and equipment throughout the state.*

[California Code of Regulations, Title 19, Division 1, §1.09.1] Order of Precedence.

In the event of any differences between California Code of Regulations, Title 19, Division 1 regulations and the standard reference documents or standard fire prevention practices, the text of California Code of Regulations, Title 19, Division 1 regulations shall govern. Where a specific provision varies from a general provision, the specific provision shall apply.

***1.11.11 Adopting agency identification.** The provisions of this code applicable to buildings identified in Section 1.11 will be identified in the Matrix Adoption Tables under the acronym SFM.*

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DIVISION II
SCOPE AND ADMINISTRATION

User notes:

About this chapter: Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—General Provisions (Sections 101–102) and Part 2—Administrative Provisions (Sections 103–115). Section 102 identifies which buildings and structures come under its purview and references other I-Codes as applicable.

This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor and property owner.

ICC code development note: Code change proposals to this chapter will be considered by the Administrative Code Development Committee during the 2025 (Group B) Code Development Cycle.

Section 104 was revised for the 2024 edition. For clarity, the relocation marginal markings have not been included. For complete information, see the Relocations table in the Preface of this code.

PART 1—GENERAL PROVISIONS

SECTION 101—SCOPE AND GENERAL REQUIREMENTS

Note: *Sections adopted or amended by state agencies are specifically indicated by an agency banner or indicated in the Matrix Adoption Table.*

[A] 101.1 Title. These regulations shall be known as the *Fire Code* of **[NAME OF JURISDICTION]**, hereinafter referred to as "this code."

[A] 101.2 Scope. This code establishes regulations affecting or relating to structures, processes, premises and safeguards regarding all of the following:

1. The hazard of fire and explosion arising from the storage, handling or use of structures, materials or devices.
2. Conditions hazardous to life, property or public welfare in the occupancy of structures or premises.
3. Fire hazards in the structure or on the premises from occupancy or operation.
4. Matters related to the construction, extension, repair, alteration or removal of fire protection systems.
5. Conditions affecting the safety of firefighters and emergency responders during emergency operations.

[A] 101.2.1 Appendices. Provisions in the appendices shall not apply unless specifically adopted.

[A] 101.3 Purpose. The purpose of this code is to establish the minimum requirements for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide a reasonable level of safety to firefighters and emergency responders during emergency operations.

[A] 101.4 Severability. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

[A] 101.5 Validity. In the event any part or provision of this code is held to be illegal or void, this shall not have the effect of making void or illegal any of the other parts or provisions hereof, which are determined to be legal; and it shall be presumed that this code would have been adopted without such illegal or invalid parts or provisions.

SECTION 102—APPLICABILITY

[A] 102.1 Construction and design provisions. The construction and design provisions of this code shall apply to:

1. Structures, facilities and conditions arising after the adoption of this code.
2. Existing structures, facilities and conditions not legally in existence at the time of adoption of this code.
3. Existing structures, facilities and conditions where required in Chapter 11.
4. Existing structures, facilities and conditions that, in the opinion of the fire code official, constitute a distinct hazard to life or property.

[A] 102.2 Administrative, operational and maintenance provisions. The administrative, operational and maintenance provisions of this code shall apply to:

1. Conditions and operations arising after the adoption of this code.
2. Existing conditions and operations.

[A] 102.3 Change of use or occupancy. A change of occupancy shall not be made unless the use or occupancy is made to comply with the requirements of this code and the *California Existing Building Code*.

Exception: Where approved by the fire code official, a change of occupancy shall be permitted without complying with the requirements of this code and the *California Existing Building Code*, provided that the new or proposed use or occupancy is less hazardous, based on life and fire risk, than the existing use or occupancy.

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[A] 102.4 Application of building code. The design and construction of new structures shall comply with the *California Building Code*, and any alterations, additions, changes in use or changes in structures required by this code, which are within the scope of the *California Building Code*, shall be made in accordance therewith.

[A] 102.5 Application of residential code. Where structures are designed and constructed in accordance with the *California Residential Code*, the provisions of this code shall apply as follows:

1. Construction and design provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies. Where interior or exterior systems or devices are installed, construction permits required by Section 105.6 shall apply.
2. Administrative, operational and maintenance provisions of this code shall apply.

[A] 102.6 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local jurisdiction as historic buildings where such buildings or structures do not constitute a distinct hazard to life or property. Fire protection in designated historic buildings shall be provided with an approved fire protection plan as required in Section 1103.1.1.

[A] 102.7 Referenced codes and standards. The codes and standards referenced in this code shall be those that are listed in Chapter 80, and such codes and standards shall be considered to be part of the requirements of this code to the prescribed extent of each such reference and as further regulated by Sections 102.7.1 and 102.7.2.

[A] 102.7.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

[A] 102.7.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

[A] 102.8 Subjects not regulated by this code. Where applicable standards or requirements are not set forth in this code, or are contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards, as approved, shall be deemed as prima facie evidence of compliance with the intent of this code. Nothing herein shall derogate from the authority of the fire code official to determine compliance with codes or standards for those activities or installations within the fire code official's jurisdiction or responsibility.

[A] 102.9 Matters not provided for. Requirements that are essential for the public safety of an existing or proposed activity, building or structure, or for the safety of the occupants thereof, that are not specifically provided for by this code, shall be determined by the fire code official.

[A] 102.10 Conflicting provisions. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

[A] 102.11 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

[A] 102.12 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

102.13 Wildland-urban interface. *The provisions of the California Wildland-Urban Interface Code shall apply to buildings and structures built in the wildland-urban interface.*

PART 2—ADMINISTRATION AND ENFORCEMENT

SECTION 103—CODE COMPLIANCE AGENCY

[A] 103.1 Creation of agency. The **[INSERT NAME OF DEPARTMENT]** is hereby created and the official in charge thereof shall be known as the fire code official. The function of the agency shall be the implementation, administration and enforcement of the provisions of this code.

[A] 103.2 Appointment. The fire code official shall be appointed by the chief appointing authority of the jurisdiction.

[A] 103.3 Deputies. In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the fire code official shall have the authority to appoint a deputy fire code official, other related technical officers, inspectors and other employees. Such employees shall have powers as delegated by the fire code official.

SECTION 104—DUTIES AND POWERS OF THE FIRE CODE OFFICIAL

[A] 104.1 General. The fire code official is hereby authorized to enforce the provisions of this code.

[A] 104.2 Determination of compliance. The fire code official shall have the authority to determine compliance with this code, to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures:

1. Shall be in compliance with the intent and purpose of this code.
2. Shall not have the effect of waiving requirements specifically provided for in this code.

[A] 104.2.1 Listed compliance. Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an approved listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the fire code official.

[A] 104.2.2 Technical assistance. To determine compliance with this code, the fire code official is authorized to require the owner or owner's authorized agent to provide a technical opinion and report.

[A] 104.2.2.1 Cost. A technical opinion and report shall be provided without charge to the jurisdiction.

[A] 104.2.2.2 Preparer qualifications. The technical opinion and report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.2.3 Content. The technical opinion and report shall analyze the properties of the design, operation or use of the building or premises and the facilities and appurtenances situated thereon to identify and propose necessary recommendations.

[A] 104.2.2.4 Tests. Where there is insufficient evidence of compliance with the provisions of this code, the fire code official shall have the authority to require tests as evidence of compliance. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized test standards, the fire code official shall approve the testing procedures. Such tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved.

Exception: Performance-based alternative materials, designs or methods of construction and equipment complying with the *International Code Council Performance Code*.

[A] 104.2.3.1 Approval authority. An alternative material, design or method of construction shall be approved where the fire code official finds that the proposed alternative is satisfactory and complies with Sections 104.2.3.2 through 104.2.3.7, as applicable.

[A] 104.2.3.2 Application and disposition. Where required, a request to use an alternative material, design or method of construction shall be submitted in writing to the fire code official for approval. Where the alternative material, design or method of construction is not approved, the fire code official shall respond in writing, stating the reasons the alternative was not approved.

[A] 104.2.3.3 Compliance with code intent. An alternative material, design or method of construction shall comply with the intent of the provisions of this code.

[A] 104.2.3.4 Equivalency criteria. An alternative material, design or method of construction shall, for the purpose intended, be not less than the equivalent of that prescribed in this code with respect to all of the following, as applicable:

1. Quality.
2. Strength.
3. Effectiveness.
4. Durability.
5. Safety, other than fire safety.
6. Fire safety.

[A] 104.2.3.5 Tests. Tests conducted to demonstrate equivalency in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict performance of the end use configuration. Tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3.5.1 Fire tests. Tests conducted to demonstrate equivalent fire safety in support of an alternative material, design or method of construction application shall be of a scale that is sufficient to predict fire safety performance of the end use configuration. Tests shall be performed by a party acceptable to the fire code official.

[A] 104.2.3.6 Reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.2.3.6.1 and 104.2.3.6.2.

[A] 104.2.3.6.1 Evaluation reports. Evaluation reports shall be issued by an approved agency and use of the evaluation report shall require approval by the fire code official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the fire code official's recognition of the approved agency. Criteria used for the evaluation shall be identified within the report and, where required, provided to the fire code official.

[A] 104.2.3.6.2 Other reports. Reports not complying with Section 104.2.3.6.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence. The report shall be prepared by a qualified engineer, specialist, laboratory or fire safety specialty organization acceptable to the fire code official. The fire code official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

[A] 104.2.3.7 Peer review. The fire code official is authorized to require submittal of a peer review report in conjunction with a request to use an alternative material, design or method of construction, prepared by a peer reviewer that is approved by the fire code official.

104.2.4 Modifications. Where there are practical difficulties involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications in accordance with Section 104.2.4.1 or 104.2.4.2.

104.2.4.1 Individual cases. The fire code official shall have the authority to grant modifications for individual cases, provided that the fire code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the code compliance agency.

104.2.4.2 Natural disasters. In preparation for, during and after a natural disaster event, as determined by the fire code official, the fire code official shall have the authority to issue written policies, procedures or rules that modify this code as necessary to protect life and property. Such policies, procedures or rules shall be made available to the public and shall include start and end dates, which can be extended at the fire code official's discretion.

[A] 104.3 Applications and permits. The fire code official is authorized to receive applications, review construction documents and issue permits for construction regulated by this code, issue permits for operations regulated by this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

[A] 104.4 Right of entry. Where it is necessary to make an inspection to enforce the provisions of this code, or where the fire code official has reasonable cause to believe that there exists in a structure or on any premises a condition that is contrary to or in violation of this code that makes the structure or premises unsafe, dangerous or hazardous, the fire code official is authorized to enter the structure or premises at all reasonable times to inspect or to perform the duties imposed on the fire code official by this code. If such structure or premises is occupied, the fire code official shall present credentials to the occupant and request entry. If such structure or premises is unoccupied, the fire code official shall first make a reasonable effort to locate the owner, the owner's authorized agent or other person having charge or control of the structure or premises and request entry. If entry is refused, the fire code official shall have recourse to every remedy provided by law to secure entry.

[A] 104.4.1 Warrant. Where the fire code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner, the owner's authorized agent, occupant or person having charge, care or control of the structure or premises shall not fail or neglect, after a proper request is made as herein provided, to permit entry therein by the fire code official for the purposes of inspection and examination pursuant to this code.

[A] 104.5 Identification. The fire code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

[A] 104.6 Notices and orders. The fire code official shall issue necessary notices or orders to ensure compliance with this code. Notices of violations shall be in accordance with Section 113.

[A] 104.7 Official records. The fire code official shall keep official records as required by Sections 104.7.1 through 104.7.6. Such official records shall be retained for not less than 5 years or for as long as the building or structure to which such records relate remains in existence, unless otherwise provided by other regulations.

[A] 104.7.1 Approvals. A record of approvals shall be maintained by the fire code official and shall be available for public inspection during business hours in accordance with applicable laws.

[A] 104.7.2 Inspections. The fire code official shall keep a record of each inspection made, including notices and orders issued, showing the findings and disposition of each.

104.7.3 Fire records. The fire code official shall keep a record of fires occurring within its jurisdiction and of facts concerning the same, including statistics as to the extent of such fires and the damage caused thereby, together with other information as required by the fire code official.

[A] 104.7.4 Code alternatives and modifications. Application for alternative materials, design and methods of construction and equipment in accordance with Section 104.2.3; modifications in accordance with Section 104.2.4; and documentation of the final decision of the fire code official for either shall be in writing and shall be retained in the official records.

[A] 104.7.5 Tests. The fire code official shall keep a record of tests conducted to comply with Sections 104.2.2.4 and 104.2.3.5.

[A] 104.7.6 Fees. The fire code official shall keep a record of fees collected and refunded in accordance with Section 108.

[A] 104.8 Liability. The fire code official, member of the board of appeals, officer or employee charged with the enforcement of this code, while acting for the jurisdiction, in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered personally liable, either civilly or criminally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

[A] 104.8.1 Legal defense. Any suit or criminal complaint instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code or other laws or ordinances implemented through the enforcement of this code shall be defended by the legal representatives of the jurisdiction until the final termination of the proceedings. The fire code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the department of fire prevention, acting in

good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.

104.9 Approved materials and equipment. Materials, equipment and devices approved by the fire code official shall be constructed and installed in accordance with such approval.

[A] 104.9.1 Materials and equipment reuse. Materials, equipment and devices shall not be reused unless such elements are in good working order and approved.

104.10 Fire investigations. The fire code official, the fire department or other responsible authority shall have the authority to investigate the cause, origin and circumstances of any fire, explosion or other hazardous condition. Information that could be related to trade secrets or processes shall not be made part of the public record, except as directed by a court of law.

104.10.1 Assistance from other agencies. Police and other enforcement agencies shall have authority to render necessary assistance in the investigation of fires when requested to do so.

104.11 Authority at fires and other emergencies. The fire chief or officer of the fire department in charge at the scene of a fire or other emergency involving the protection of life or property, or any part thereof, shall have the authority to direct such operation as necessary to extinguish or control any fire, perform any rescue operation, investigate the existence of suspected or reported fires, gas leaks or other hazardous conditions or situations, or take any other action necessary in the reasonable performance of duty. In the exercise of such power, the fire chief is authorized to prohibit any person, vehicle, vessel or thing from approaching the scene, and is authorized to remove, or cause to be removed or kept away from the scene, any vehicle, vessel or thing that could impede or interfere with the operations of the fire department and, in the judgment of the fire chief, any person not actually and usefully employed in the extinguishing of such fire or in the preservation of property in the vicinity thereof.

104.11.1 Barricades. The fire chief or officer of the fire department in charge at the scene of an emergency is authorized to place ropes, guards, barricades or other obstructions across any street, alley, place or private property in the vicinity of such operation so as to prevent accidents or interference with the lawful efforts of the fire department to manage and control the situation and to handle fire apparatus.

104.11.2 Obstructing operations. Persons shall not obstruct the operations of the fire department in connection with extinguishment or control of any fire, or actions relative to other emergencies, or disobey any lawful command of the fire chief or officer of the fire department in charge of the emergency, or any part thereof, or any lawful order of a police officer assisting the fire department.

104.11.3 Systems and devices. Persons shall not render a system or device inoperative during an emergency unless by direction of the fire chief or fire department official in charge of the incident.

SECTION 105—PERMITS

[A] 105.1 General. Permits shall be in accordance with Sections 105.1.1 through 105.6.25.

[A] 105.1.1 Permits required. A property owner or owner's authorized agent who intends to conduct an operation or business, or install or modify systems and equipment that are regulated by this code, or to cause any such work to be performed, shall first make application to the fire code official and obtain the required permit.

105.1.2 Types of permits. There shall be two types of permits as follows:

1. Operational permit. An operational permit allows the applicant to conduct an operation or a business for which a permit is required by Section 105.5 for either:
    1.1. A prescribed period.
    1.2. Until renewed or revoked.
2. Construction permit. A construction permit allows the applicant to install or modify systems and equipment for which a permit is required by Section 105.6.

105.1.3 Multiple permits for the same location. Where more than one permit is required for the same location, the *fire code official* is authorized to consolidate such permits into a single permit provided that each provision is listed in the permit.

[A] 105.1.4 Emergency repairs. Where equipment replacement and repairs must be performed in an emergency situation, the permit application shall be submitted within the next working business day to the fire code official.

[A] 105.1.5 Repairs. Application or notice to the fire code official is not required for ordinary repairs to structures, equipment or systems. Such repairs shall not include the cutting away of any wall, partition or portion thereof, the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the egress requirements; nor shall any repairs include addition to, alteration of, replacement or relocation of any standpipe, fire protection water supply, automatic sprinkler system, fire alarm system or other work affecting fire protection or life safety.

[A] 105.1.6 Annual permit. Instead of an individual construction permit for each alteration to an already approved system or equipment installation, the fire code official is authorized to issue an annual permit on application therefor to any person, firm or corporation regularly employing one or more qualified tradespersons in the building, structure or on the premises owned or operated by the applicant for the permit.

[A] 105.1.6.1 Annual permit records. The person to whom an annual permit is issued shall keep a detailed record of alterations made under such annual permit. The fire code official shall have access to such records at all times or such records shall be filed with the fire code official as designated.

[A] 105.2 Application. Application for a permit required by this code shall be made to the fire code official in such form and detail as prescribed by the fire code official. Applications for permits shall be accompanied by such plans as prescribed by the fire code official.

[A] 105.2.1 Refusal to issue permit. If the application for a permit describes a use that does not conform to the requirements of this code and other pertinent laws and ordinances, the fire code official shall not issue a permit, but shall return the application to the applicant with the refusal to issue such permit. Such refusal shall, where requested, be in writing and shall contain the reasons for refusal.

[A] 105.2.2 Inspection authorized. Before a new operational permit is approved, the fire code official is authorized to inspect the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used to determine compliance with this code or any operational constraints required.

[A] 105.2.3 Time limitation of application. An application for a permit for any proposed work or operation shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been diligently prosecuted or a permit shall have been issued; except that the fire code official is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated.

[A] 105.2.4 Action on application. The fire code official shall examine or cause to be examined applications for permits and amendments thereto within a reasonable time after filing. If the application or the construction documents do not conform to the requirements of pertinent laws, the fire code official shall reject such application in writing, stating the reasons therefor. If the fire code official is satisfied that the proposed work or operation conforms to the requirements of this code and laws and ordinances applicable thereto, the fire code official shall issue a permit therefor as soon as practicable.

[A] 105.3 Conditions of a permit. A permit shall constitute permission to maintain, store or handle materials; or to conduct processes that produce conditions hazardous to life or property; or to install equipment utilized in connection with such activities; or to install or modify any fire protection system or equipment or any other construction, equipment installation or modification in accordance with the provisions of this code where a permit is required by Section 105.5 or 105.6. Such permission shall not be construed as authority to violate, cancel or set aside any of the provisions of this code or other applicable regulations or laws of the jurisdiction.

[A] 105.3.1 Expiration. An operational permit shall remain in effect until reissued, renewed or revoked, or for such a period of time as specified in the permit. Construction permits shall automatically become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized by such permit is suspended or abandoned for a period of 180 days after the time the work is commenced. Before such work recommences, a new permit shall be first obtained and the fee to recommence work, if any, shall be one-half the amount required for a new permit for such work, provided that changes have not been made and will not be made in the original construction documents for such work, and provided further that such suspension or abandonment has not exceeded one year. Permits are not transferable and any change in occupancy, operation, tenancy or ownership shall require that a new permit be issued.

> ***105.3.1.1 Expiration.*** *On or after January 1, 2019, every permit issued shall become invalid unless the work on the site authorized by such permit is commenced within 12 months after its issuance or if the work authorized on the site by such permit is suspended or abandoned for a period of 12 months after the time the work is commenced. The building official is authorized to grant, in writing, one or more extensions of time for periods not more than 180 days each. The extension shall be requested in writing and justifiable cause demonstrated. (See Health and Safety Code Section 18938.5 and 18938.6.*

[A] 105.3.2 Extensions. A permittee holding an unexpired permit shall have the right to apply for an extension of the time within which the permittee will commence work under that permit where work is unable to be commenced within the time required by this section for good and satisfactory reasons. The fire code official is authorized to grant, in writing, one or more extensions of the time period of a permit for periods of not more than 180 days each. Such extensions shall be requested by the permit holder in writing and justifiable cause demonstrated.

[A] 105.3.3 Occupancy prohibited before approval. The building or structure shall not be occupied prior to the fire code official issuing a permit and conducting associated inspections indicating the applicable provisions of this code have been met.

[A] 105.3.4 Conditional permits. Where permits are required and on the request of a permit applicant, the fire code official is authorized to issue a conditional permit to occupy the premises or portion thereof before the entire work or operations on the premises is completed, provided that such portion or portions will be occupied safely prior to full completion or installation of equipment and operations without endangering life or public welfare. The fire code official shall notify the permit applicant in writing of any limitations or restrictions necessary to keep the permit area safe. The holder of a conditional permit shall proceed only to the point for which approval has been given, at the permit holder's own risk and without assurance that approval for the occupancy or the utilization of the entire premises, equipment or operations will be granted.

[A] 105.3.5 Posting the permit. Issued permits shall be kept on the premises designated therein at all times and shall be readily available for inspection by the fire code official.

[A] 105.3.6 Compliance with code. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinance of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents and other data shall not prevent the fire code official from requiring the correction of errors in the construction documents and other data. Any addition to or alteration of approved construction documents shall be approved in advance by the fire code official, as evidenced by the issuance of a new or amended permit.

[A] 105.3.7 Information on the permit. The fire code official shall issue all permits required by this code on an approved form furnished for that purpose. The permit shall contain a general description of the operation or occupancy and its location and any

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other information required by the fire code official. Issued permits shall bear the signature of the fire code official or other approved legal authorization.

[A] 105.3.8 Validity of permit. The issuance or granting of a permit shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of any other ordinances of the jurisdiction. Permits presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid. The issuance of a permit based on construction documents, operational documents and other data shall not prevent the fire code official from requiring correction of errors in the documents or other data.

[A] 105.4 Revocation. The fire code official is authorized to revoke a permit issued under the provisions of this code where it is found by inspection or otherwise that there has been a false statement or misrepresentation as to the material facts in the application or construction documents on which the permit or approval was based including, but not limited to, any one of the following:

1. The permit is used for a location or establishment other than that for which it was issued.
2. The permit is used for a condition or activity other than that listed in the permit.
3. Conditions and limitations set forth in the permit have been violated.
4. There have been any false statements or misrepresentations as to the material fact in the application for permit or plans submitted or a condition of the permit.
5. The permit is used by a different person or firm than the name for which it was issued.
6. The permittee failed, refused or neglected to comply with orders or notices duly served in accordance with the provisions of this code within the time provided therein.
7. The permit was issued in error or in violation of an ordinance, regulation or this code.

105.5 Required operational permits. The fire code official is authorized to issue operational permits for the operations set forth in Sections 105.5.2 through 105.5.5*4*.

105.5.1 Additive manufacturing. An operational permit is required to conduct additive manufacturing operations regulated by Section 319.3.

105.5.2 Aerosol products, aerosol cooking spray products and plastic aerosol 3 products. An operational permit is required to manufacture, store or handle an aggregate quantity of Level 2 or Level 3 aerosol products, aerosol cooking spray products or plastic aerosol 3 products in excess of 500 pounds (227 kg) net weight.

105.5.3 Amusement areas. An operational permit is required to operate a special amusement area.

105.5.4 Aviation facilities. An operational permit is required to use a Group H or Group S occupancy for aircraft servicing or repair and aircraft fuel-servicing vehicles. Additional permits required by other sections of this code include, but are not limited to, hot work, hazardous materials and flammable or combustible finishes.

105.5.5 Carnivals and fairs. An operational permit is required to conduct a carnival or fair.

105.5.6 Cellulose nitrate film. An operational permit is required to store, handle or use cellulose nitrate film in a Group A occupancy.

105.5.7 Combustible dust-producing operations. An operational permit is required to operate a grain elevator, flour starch mill, feed mill, or a plant pulverizing aluminum, coal, cocoa, magnesium, spices or sugar, or other operations producing combustible dusts as defined in Chapter 2.

105.5.8 Combustible fibers. An operational permit is required for the storage and handling of combustible fibers in quantities greater than 100 cubic feet (2.8 m^3).

Exception: A permit is not required for agricultural storage.

105.5.9 Compressed gases. An operational permit is required for the storage, use or handling at normal temperature and pressure (NTP) of compressed gases in excess of the amounts listed in Table 105.5.9.

Exception: Vehicles equipped for and using compressed gas as a fuel for propelling the vehicle.

TABLE 105.5.9—PERMIT AMOUNTS FOR COMPRESSED GASES

TYPE OF GAS	AMOUNT (cubic feet at NTP)
Carbon dioxide used in carbon dioxide enrichment systems	875 (100 lb)
Carbon dioxide used in insulated liquid carbon dioxide beverage dispensing applications	875 (100 lb)
Corrosive	200
Flammable (except cryogenic fluids and liquefied petroleum gases)	200
Highly toxic	Any Amount
Inert and simple asphyxiant	6,000
Oxidizing (including oxygen)	504
Pyrophoric	Any Amount
Toxic	Any Amount

For SI: 1 cubic foot = 0.02832 m^3.

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105.5.10 Covered and open mall buildings. An operational permit is required for:

1. The placement of retail fixtures and displays, concession equipment, displays of highly combustible goods and similar items in the mall.
2. The display of liquid- or gas-fired equipment in the mall.
3. The use of open-flame or flame-producing equipment in the mall.

105.5.11 Cryogenic fluids. An operational permit is required to produce, store, transport on site, use, handle or dispense cryogenic fluids in excess of the amounts listed in Table 105.5.11.

Exception: Permits are not required for vehicles equipped for and using cryogenic fluids as a fuel for propelling the vehicle or for refrigerating the lading.

TABLE 105.5.11—PERMIT AMOUNTS FOR CRYOGENIC FLUIDS

TYPE OF CRYOGENIC FLUID	INSIDE BUILDING (gallons)	OUTSIDE BUILDING (gallons)
Flammable	More than 1	60
Inert	60	500
Oxidizing (includes oxygen)	10	50
Physical or health hazard not indicated above	Any Amount	Any Amount

For SI: 1 gallon = 3.785 L.

105.5.12 Cutting and welding. An operational permit is required to conduct cutting or welding operations within the jurisdiction.

105.5.13 Dry cleaning. An operational permit is required to engage in the business of dry cleaning or to change to a more hazardous cleaning solvent used in existing dry cleaning equipment.

105.5.14 Energy storage systems. An operational permit is required for stationary and mobile energy storage systems regulated by Section 1207. *Operational permits shall not be required for ESS located at detached one- and two-family dwellings and townhouses, other than Group R-4.*

105.5.15 Exhibits and trade shows. An operational permit is required to operate exhibits and trade shows.

105.5.16 Explosives. An operational permit is required for the manufacture, storage, handling, sale or use of any quantity of explosives, explosive materials, fireworks or pyrotechnic special effects within the scope of Chapter 56. *See Health and Safety Code Division 11, Part 1, Sections 12000, et seq. for additional requirements.*

Exception: Storage in Group R-3 occupancies of smokeless propellant, black powder and small arms primers for personal use, not for resale and in accordance with Section 5606.

105.5.17 Fire hydrants and valves. An operational permit is required to use or operate fire hydrants or valves intended for fire suppression purposes that are installed on water systems and provided with ready access from a fire apparatus access road that is open to or generally used by the public.

Exception: A permit is not required for authorized employees of the water company that supplies the system or the fire department to use or operate fire hydrants or valves.

105.5.18 Flammable and combustible liquids. An operational permit is required:

1. To use or operate a pipeline for the transportation within facilities of flammable or combustible liquids. This requirement shall not apply to the off-site transportation in pipelines regulated by the Department of Transportation (DOTn) nor does it apply to piping systems.
2. To store, handle or use Class I liquids in excess of 5 gallons (19 L) in a building or in excess of 10 gallons (37.9 L) outside of a building, except that a permit is not required for the following:
   2.1. The storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant or mobile heating plant, unless such storage, in the opinion of the fire code official, would cause an unsafe condition.
   2.2. The storage or use of paints, oils, varnishes or similar flammable mixtures where such liquids are stored for maintenance, painting or similar purposes for a period of not more than 30 days.
3. To store, handle or use Class II or Class IIIA liquids in excess of 25 gallons (95 L) in a building or in excess of 60 gallons (227 L) outside a building, except for fuel oil used in connection with oil-burning equipment.
4. To store, handle or use Class IIIB liquids in tanks or portable tanks for fueling motor vehicles at motor fuel-dispensing facilities or where connected to fuel-burning equipment.

   Exception: Fuel oil and used motor oil used for space heating or water heating.
5. To remove Class I or II liquids from an underground storage tank used for fueling motor vehicles by any means other than the approved, stationary on-site pumps normally used for dispensing purposes.
6. To operate tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.

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7. To place temporarily out of service (for more than 90 days) an underground, protected above-ground or above-ground flammable or combustible liquid tank.
8. To change the type of contents stored in a flammable or combustible liquid tank to a material that poses a greater hazard than that for which the tank was designed and constructed.
9. To manufacture, process, blend or refine flammable or combustible liquids.
10. To engage in the dispensing of liquid fuels into the fuel tanks of motor vehicles at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or to engage in on-demand mobile fueling operations in accordance with Section 5707.
11. To utilize a site for the dispensing of liquid fuels from tank vehicles into the fuel tanks of motor vehicles, marine craft and other special equipment at commercial, industrial, governmental or manufacturing establishments in accordance with Section 5706.5.4 or, where required by the fire code official, to utilize a site for on-demand mobile fueling operations in accordance with Section 5707.

105.5.19 Floor finishing. An operational permit is required for floor finishing or surfacing operations exceeding 350 square feet (33 m^2) using Class I or Class II liquids.

105.5.20 Fruit and crop ripening. An operational permit is required to operate a fruit- or crop-ripening facility or conduct a fruit-ripening process using ethylene gas.

105.5.21 Fumigation and insecticidal fogging. An operational permit is required to operate a business of fumigation or insecticidal fogging, and to maintain a room, vault or chamber in which a toxic or flammable fumigant is used.

105.5.22 Hazardous materials. An operational permit is required to store, transport on site, dispense, use or handle hazardous materials in excess of the amounts listed in Table 105.5.22.

TABLE 105.5.22—PERMIT AMOUNTS FOR HAZARDOUS MATERIALS

TYPE OF MATERIAL	AMOUNT
Combustible liquids	See Section 105.5.*16*
Corrosive materials	
Gases	See Section 105.5.*8*
Liquids	55 gallons
Solids	*500* pounds
Explosive materials	See Section 105.5.*14*
Flammable materials	
Gases	See Section 105.5.*8*
Liquids	See Section 105.5.*16*
Solids	100 pounds
Highly toxic materials	
Gases	See Section 105.5.*8*
Liquids	Any Amount
Solids	Any Amount
Organic peroxides	
Liquids Class I Class II Class III Class IV Class V	 Any Amount Any Amount 1 gallon 2 gallons No Permit Required
Solids Class I Class II Class III Class IV Class V	 Any Amount Any Amount 10 pounds 20 pounds No Permit Required
Oxidizing materials	
Gases	See Section 105.5.9

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TABLE 105.5.22—PERMIT AMOUNTS FOR HAZARDOUS MATERIALS—continued	
TYPE OF MATERIAL	**AMOUNT**
Liquids	
Class 4	Any Amount
Class 3	1 gallon[a]
Class 2	10 gallons
Class 1	55 gallons
Solids	
Class 4	Any Amount
Class 3	10 pounds[b]
Class 2	100 pounds
Class 1	500 pounds
Pyrophoric materials	
Gases	Any Amount
Liquids	Any Amount
Solids	Any Amount
Toxic materials	
Gases	See Section 105.5.*8*
Liquids	10 gallons
Solids	100 pounds
Unstable (reactive) materials	
Liquids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	5 gallons
Class 1	10 gallons
Solids	
Class 4	Any Amount
Class 3	Any Amount
Class 2	50 pounds
Class 1	100 pounds
Water-reactive materials	
Liquids	
Class 3	Any Amount
Class 2	5 gallons
Class 1	55 gallons
Solids	
Class 3	Any Amount
Class 2	50 pounds
Class 1	500 pounds

For SI: 1 gallon = 3.785 L, 1 pound = 0.454 kg.

a. 22 gallons where Table 5003.1.1(1) Note j applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 22 gallons or less.

b. 220 pounds where Table 5003.1.1(1) Note j applies and hazard identification signs in accordance with Section 5003.5 are provided for quantities of 220 pounds or less.

105.5.23 HPM facilities. An operational permit is required to store, handle or use hazardous production materials.

105.5.24 High-piled storage. An operational permit is required to use a building or portion thereof with more than 500 square feet (46 m^2), including aisles, of high-piled combustible storage.

105.5.25 Hot work operations. An operational permit is required for hot work including, but not limited to:

1. Public exhibitions and demonstrations where hot work is conducted.
2. Use of portable hot work equipment inside a structure.

   Exception: Work that is conducted under a construction permit.
3. Fixed-site hot work equipment, such as welding booths.
4. Hot work conducted within a wildfire risk area.
5. Application of roof coverings with the use of an open-flame device.
6. Where approved, the fire code official shall issue a permit to carry out a hot work program. This program allows approved personnel to regulate their facility's hot work operations. The approved personnel shall be trained in the fire safety aspects denoted in this chapter and shall be responsible for issuing permits requiring compliance with the

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requirements found in Chapter 35. These permits shall be issued only to their employees or hot work operations under their supervision.

105.5.26 Indoor plant cultivation. An operational permit is required for plant cultivation where a carbon dioxide (CO_2) enriched environment is created.

105.5.27 Industrial ovens. An operational permit is required for operation of industrial ovens regulated by Chapter 30.

105.5.28 Liquid- or gas-fueled vehicles or equipment in assembly buildings. An operational permit is required to display, operate or demonstrate liquid- or gas-fueled vehicles or equipment in assembly buildings.

105.5.29 Lithium batteries. An operational permit is required for an accumulation of more than 15 cubic feet (0.42 m) of lithium-ion and lithium metal batteries, where required by Section 320.2.

105.5.30 LP-gas. An operational permit is required for:

1. Storage and use of LP-gas.

   Exception: A permit is not required for individual containers with a 500-gallon (1893 L) water capacity or less or multiple container systems having an aggregate quantity not exceeding 500 gallons (1893 L), serving occupancies in Group R-3.

2. Operation of cargo tankers that transport LP-gas.

105.5.31 Lumber yards and woodworking plants. An operational permit is required for the storage or processing of lumber exceeding 100,000 board feet (8,333 ft^3) (236 m^3).

105.5.32 Magnesium. An operational permit is required to melt, cast, heat treat or grind more than 10 pounds (4.54 kg) of magnesium.

105.5.33 Miscellaneous combustible storage. An operational permit is required to store in any building or on any premises in excess of 2,500 cubic feet (71 m^3) gross volume of combustible empty packing cases, boxes, barrels or similar containers, combustible pallets, rubber tires, rubber, cork or similar combustible material.

105.5.34 Mobile food preparation vehicles. An operational permit is required for mobile food preparation vehicles equipped with appliances that produce smoke or grease-laden vapors.

105.5.35 Motor fuel-dispensing facilities. An operational permit is required for the operation of automotive, marine and fleet motor fuel-dispensing facilities.

105.5.36 Open burning. An operational permit is required for the kindling or maintaining of an open fire or a fire on any public street, alley, road, or other public or private ground. Instructions and stipulations of the permit shall be complied with.

Exception: *Recreational fires.*

105.5.37 Open flames and torches. An operational permit is required to remove paint with a torch, or to use a torch or open-flame device in a wildfire risk area.

105.5.38 Open flames and candles. An operational permit is required to use open flames or candles in connection with assembly areas, dining areas of restaurants or drinking establishments.

105.5.39 Organic coatings. An operational permit is required for any organic-coating manufacturing operation producing more than 1 gallon (4 L) of an organic coating in one day.

105.5.40 Outdoor assembly event. An operational permit is required to conduct an *outdoor assembly event* where planned attendance exceeds 1,000 persons.

105.5.41 Places of assembly. An operational permit is required to operate a place of assembly.

105.5.42 Plant extraction systems. An operational permit is required to use plant extraction systems.

105.5.43 Private fire hydrants. An operational permit is required for the removal from service, use or operation of private fire hydrants.

Exception: A permit is not required for private industry with trained maintenance personnel, private fire brigade or fire departments to maintain, test and use private hydrants.

105.5.44 Pyrotechnic special effects material. An operational permit is required for use and handling of pyrotechnic special effects material. *See Health and Safety Code Division 11, Part 2, Sections 12500, et seq. for additional requirements.*

105.5.45 Pyroxylin plastics. An operational permit is required for storage or handling of more than 25 pounds (11 kg) of cellulose nitrate (pyroxylin) plastics, and for the assembly or manufacture of articles involving pyroxylin plastics.

105.5.46 Refrigeration equipment. An operational permit is required to operate a mechanical refrigeration unit or system regulated by Chapter 6.

105.5.47 Repair garages and motor fuel-dispensing facilities. An operational permit is required for operation of repair garages.

105.5.48 Rooftop heliports. An operational permit is required for the operation of a rooftop heliport.

105.5.49 Spraying or dipping. An operational permit is required to conduct a spraying or dipping operation utilizing flammable or combustible liquids, or the application of combustible powders regulated by Chapter 24.

105.5.50 Storage of scrap tires and tire byproducts. An operational permit is required to establish, conduct or maintain storage of scrap tires and tire byproducts that exceeds 2,500 cubic feet (71 m^3) of total volume of scrap tires, and for indoor storage of tires and tire byproducts.

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105.5.51 Temporary membrane structures, special event structures and tents. An operational permit is required to operate an air-supported temporary membrane structure, a temporary special event structure or a tent having an area in excess of 400 square feet (37 m^2).

Exceptions:

1. Tents used exclusively for recreational camping purposes.
2. Tents, curtains and extensions attached thereto, when used for funeral services.
3. Tents open on all sides, which comply with all of the following:
   - 3.1. Individual tents having a maximum size of 700 square feet (65 m^2).
   - 3.2. The aggregate area of multiple tents placed side by side without a fire break clearance of not less than 12 feet (3658 mm) shall not exceed 700 square feet (65 m^2) total.
   - 3.3. A minimum clearance of 12 feet (3658 mm) to structures and other tents shall be provided.

105.5.52 Tire-rebuilding plants. An operational permit is required for the operation and maintenance of a tire-rebuilding plant.

105.5.53 Waste handling. An operational permit is required for the operation of wrecking yards, junk yards and waste material-handling facilities.

105.5.54 Wood products. An operational permit is required to store chips, hogged material, lumber or plywood in excess of 200 cubic feet (6 m^3).

105.5.55 Temporary heating or cooking in tents or membrane structures. An operational permit is required to operate temporary heating or cooking equipment within tents or membrane structures.

105.5.56 Temporary heating or cooking in wildfire risk areas. Where required by local regulations, an operational permit is required to operate temporary heating or cooking equipment in wildfire risk areas

105.5.57 Temporary heating for construction sites. An operational permit is required to operate temporary heating equipment in structures during the course of construction, alteration or demolition.

105.5.58 Mobile fueling of hydrogen-fueled vehicles.

An operational permit is required:

1. *To engage in the mobile dispensing of gaseous hydrogen as a fuel into the fuel tanks of motor vehicles.*
2. *Where required by the fire code official, to utilize a site for the dispensing of gaseous hydrogen as a fuel from tank vehicles into the fuel tanks of motor vehicles.*

   Exception: *In cases of an emergency, a site permit is not required.*

105.5.59 Additional permits. *In addition to the permits required by Section 105.6, the following permits shall be obtained from the Bureau of Fire Prevention prior to engaging in the following activities, operations, practices or functions:*

1. *Production facilities. To change use or occupancy, or allow the attendance of a live audience, or for wrap parties.*
2. *Pyrotechnics and special effects. To use pyrotechnic special effects, open flame, use of flammable or combustible liquids and gases, welding and the parking of motor vehicles in any building or location used for the purpose of motion picture, television and commercial production.*
3. *Live audiences. To install seating arrangements for live audiences in approved production facilities, production studios and sound stages. See Chapter 48.*

[A] 105.6 Required construction permits. The fire code official is authorized to issue construction permits for work as set forth in Sections 105.6.1 through 105.6.25.

[A] 105.6.1 Automatic fire-extinguishing systems. A construction permit is required for installation of or modification to an automatic fire-extinguishing system, other than an automatic sprinkler system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.2 Automatic sprinkler systems. A construction permit is required for installation of or modification to an automatic sprinkler system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.3 Compressed gases. Where the compressed gases in use or storage exceed the amounts listed in Table 105.5.9, a construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a compressed gas system.

Exceptions:

1. Routine maintenance.
2. For emergency repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

[A] 105.6.4 Cryogenic fluids. A construction permit is required for installation of or alteration to outdoor stationary cryogenic fluid storage systems where the system capacity exceeds the amounts listed in Table 105.5.11. Maintenance performed in accordance with this code is not considered to be an alteration and does not require a construction permit.

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[A] 105.6.5 Emergency responder communication coverage system. A construction permit is required for installation of or modification to in-building, two-way emergency responder communication coverage systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.6.6 Energy storage systems. A construction permit is required to install energy storage systems regulated by Section 1207.

[A] 105.6.7 Fire alarm and detection systems and related equipment. A construction permit is required for installation of or modification to fire alarm and detection systems and related equipment. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.6.8 Fire pumps and related equipment. A construction permit is required for installation of or modification to fire pumps and related fuel tanks, jockey pumps, controllers and generators. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.6.9 Flammable and combustible liquids. A construction permit is required:

1. To install, repair or modify a pipeline for the transportation of flammable or combustible liquids.
2. To install, construct or alter tank vehicles, equipment, tanks, plants, terminals, wells, fuel-dispensing stations, refineries, distilleries and similar facilities where flammable and combustible liquids are produced, processed, transported, stored, dispensed or used.
3. To install, alter, remove, abandon or otherwise dispose of a flammable or combustible liquid tank.

[A] 105.6.10 Fuel cell power systems. A construction permit is required to install stationary fuel cell power systems.

[A] 105.6.11 Gas detection systems. A construction permit is required for the installation of or modification to gas detection systems. Maintenance performed in accordance with this code is not considered a modification and shall not require a permit.

[A] 105.6.12 Gates and barricades across fire apparatus access roads. A construction permit is required for the installation of or modification to a gate or barricade across a fire apparatus access road.

[A] 105.6.13 Hazardous materials. A construction permit is required to install, repair damage to, abandon, remove, place temporarily out of service, or close or substantially modify a storage facility or other area regulated by Chapter 50 where the hazardous materials in use or storage exceed the amounts listed in Table 105.5.22.

Exceptions:

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

[A] 105.6.14 High-piled combustible storage. A construction permit is required for the installation of or modification to a structure with more than 500 square feet (46 m^2), including aisles, of high-piled combustible storage. Maintenance performed in accordance with this code is not considered to be a modification and does not require a construction permit.

[A] 105.6.15 Industrial ovens. A construction permit is required for installation of industrial ovens regulated by Chapter 30.

Exceptions:

1. Routine maintenance.
2. For repair work performed on an emergency basis, application for permit shall be made within two working days of commencement of work.

[A] 105.6.16 LP-gas. A construction permit is required for installation of or modification to an LP-gas system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.17 Motor vehicle repair rooms and booths. A construction permit is required to install or modify a motor vehicle repair room or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.18 Plant extraction systems. A construction permit is required for installation of or modification to plant extraction systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.19 Private fire hydrants. A construction permit is required for the installation or modification of private fire hydrants. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.20 Smoke control or smoke exhaust systems. Construction permits are required for installation of or alteration to smoke control or smoke exhaust systems. Maintenance performed in accordance with this code is not considered to be an alteration and does not require a permit.

[A] 105.6.21 Solar photovoltaic power systems. A construction permit is required to install or modify solar photovoltaic power systems. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.22 Special event structure. A single construction permit is required to erect and take down a temporary special event structure in accordance with Section 105.5.51.

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[A] 105.6.23 Spraying or dipping. A construction permit is required to install or modify a spray room, dip tank or booth. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.24 Standpipe systems. A construction permit is required for the installation, modification or removal from service of a standpipe system. Maintenance performed in accordance with this code is not considered to be a modification and does not require a permit.

[A] 105.6.25 Temporary membrane structures and tents. A construction permit is required to erect an air-supported temporary membrane structure, a temporary special event structure or a tent in accordance with Section 105.5.51.

SECTION 106—CONSTRUCTION DOCUMENTS

[A] 106.1 Submittals. Construction documents and supporting data shall be submitted in two or more sets with each application for a permit and in such form and detail as required by the fire code official. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

Exception: The fire code official is authorized to waive the submission of construction documents and supporting data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that review of construction documents is not necessary to obtain compliance with this code.

[A] 106.2 Examination of documents. The fire code official shall examine or cause to be examined the accompanying construction documents and shall ascertain by such examinations whether the work indicated and described is in accordance with the requirements of this code.

[A] 106.2.1 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Documents in a digital format are allowed to be submitted where approved by the fire code official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations as determined by the fire code official.

[A] 106.2.2 Fire protection system shop drawings. Shop drawings for the fire protection system(s) shall be submitted to indicate compliance with this code and the construction documents, and shall be approved prior to the start of installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9.

[A] 106.2.3 Applicant responsibility. It shall be the responsibility of the applicant to ensure that the construction documents include all of the fire protection requirements and the shop drawings are complete and in compliance with the applicable codes and standards.

[A] 106.2.4 Approved documents. Construction documents approved by the fire code official are approved with the intent that such construction documents comply in all respects with this code. Review and approval by the fire code official shall not relieve the applicant of the responsibility of compliance with this code.

[A] 106.2.4.1 Phased approval. The fire code official is authorized to issue a permit for the construction of part of a structure, system or operation before the construction documents for the whole structure, system or operation have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such permit for parts of a structure, system or operation shall proceed at the holder's own risk with the building operation and without assurance that a permit for the entire structure, system or operation will be granted.

[A] 106.3 Amended construction documents. Work shall be installed in accordance with the approved construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.

[A] 106.4 Retention of construction documents. One set of construction documents shall be retained by the fire code official for a period of not less than 180 days from date of completion of the permitted work, or as required by state or local laws. One set of approved construction documents shall be returned to the applicant, and said set shall be kept on the site of the building or work at all times during which the work authorized thereby is in progress.

SECTION 107—TEMPORARY STRUCTURES, USES, EQUIPMENT AND SYSTEMS

[A] 107.1 General. The fire code official is authorized to issue a permit for temporary structures, uses, equipment or systems as required in Sections 105.5 and 105.6. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The fire code official is authorized to grant extensions for demonstrated cause.

[A] 107.2 Conformance. Temporary uses, equipment and systems shall conform to the requirements of this code as necessary to ensure health, safety and general welfare.

[A] 107.3 Temporary service utilities. The fire code official is authorized to give permission to temporarily supply service utilities in accordance with Section 111.

[A] 107.4 Termination of approval. The fire code official is authorized to terminate such permit for temporary uses, equipment or systems and to order the same to be discontinued.

SECTION 108—FEES

[A] 108.1 Fees. A permit shall not be issued until the fees have been paid, nor shall an amendment to a permit be released until the additional fee, if any, has been paid.

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[A] 108.2 Schedule of permit fees. Where a permit is required, a fee for each permit shall be paid as required, in accordance with the schedule as established by the applicable governing authority.

108.3 Permit valuations. The applicant for a permit shall provide an estimated value of the work for which the permit is being issued at the time of application. Such estimated valuations shall include the total value of work, including materials and labor, for which the permit is being issued, such as electrical, gas, mechanical, plumbing equipment and permanent systems. Where, in the opinion of the fire code official, the valuation is underestimated, the permit shall be denied unless the applicant can show detailed estimates acceptable to the fire code official. The fire code official shall have the authority to adjust the final valuation for permit fees.

[A] 108.4 Work commencing before permit issuance. A person who commences any work, activity or operation regulated by this code before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority, which shall be in addition to the required permit fees.

[A] 108.5 Related fees. The payment of the fee for the construction, alteration, removal or demolition of work done in connection to or concurrently with the work or activity authorized by a permit shall not relieve the applicant or holder of the permit from the payment of other fees that are prescribed by law.

[A] 108.6 Refunds. The applicable governing authority is authorized to establish a refund policy.

SECTION 109—INSPECTIONS

[A] 109.1 Inspection authority. The fire code official is authorized to enter and examine any building, structure, marine vessel, vehicle or premises in accordance with Section 104.4 for the purpose of enforcing this code.

[A] 109.2 Inspections. The fire code official is authorized to conduct such inspections as are deemed necessary to determine the extent of compliance with the provisions of this code and to approve reports of inspection by approved agencies or individuals. Reports of such inspections shall be prepared and submitted in writing for review and approval. Inspection reports shall be certified by a responsible officer of such approved agency or by the responsible individual. The fire code official is authorized to engage such expert opinion as deemed necessary to report on unusual, detailed or complex technical issues subject to the approval of the governing body.

[A] 109.2.1 Inspection requests. It shall be the duty of the holder of the permit or their duly authorized agent to notify the fire code official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.

[A] 109.2.2 Approval required. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the fire code official. The fire code official, on notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected, and such portion shall not be covered or concealed until authorized by the fire code official.

[A] 109.3 Concealed work. It shall be the duty of the permit applicant to cause the work to remain visible and able to be accessed for inspection purposes. Where any installation subject to inspection prior to use is covered or concealed without having first been inspected, the fire code official shall have the authority to require that such work be made visible and able to be accessed for inspection. Neither the fire code official nor the jurisdiction shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

[A] 109.4 Approvals. Approval as the result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel provisions of this code or of other ordinances of the jurisdiction shall not be valid.

SECTION 110—MAINTENANCE

[A] 110.1 Maintenance of safeguards. Where any device, equipment, system, condition, arrangement, level of protection, or any other feature is required for compliance with the provisions of this code, or otherwise installed, such device, equipment, system, condition, arrangement, level of protection, or other feature shall thereafter be continuously maintained in accordance with this code and applicable referenced standards.

[A] 110.2 Testing and operation. Equipment requiring periodic testing or operation to ensure maintenance shall be tested or operated as specified in this code.

[A] 110.2.1 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the fire code official for inspection and testing.

[A] 110.3 Recordkeeping. A record of periodic inspections, tests, servicing and other operations and maintenance shall be maintained on the premises or other approved location for not less than 3 years, or a different period of time where specified in this code or referenced standards. Records shall be made available for inspection by the fire code official, and a copy of the records shall be provided to the fire code official on request.

The fire code official is authorized to prescribe the form and format of such recordkeeping. The fire code official is authorized to require that certain required records be filed with the fire code official.

[A] 110.4 Supervision. Maintenance and testing shall be under the supervision of a responsible person who shall ensure that such maintenance and testing are conducted at specified intervals in accordance with this code.

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110.5 Rendering equipment inoperable. Portable or fixed fire-extinguishing systems or devices, and fire-warning systems, shall be provided with ready access and shall not be rendered inoperative, except as necessary during emergencies, maintenance, repairs, alterations, drills or prescribed testing.

[A] 110.6 Overcrowding. Overcrowding or admittance of any person beyond the approved capacity of a building or a portion thereof shall not be allowed. The fire code official, on finding any overcrowding conditions or obstructions in aisles, passageways or other means of egress, or on finding any condition that constitutes a life safety hazard, shall be authorized to cause the event to be stopped until such condition or obstruction is corrected.

SECTION 111—SERVICE UTILITIES

[A] 111.1 Authority to disconnect service utilities. The fire code official shall have the authority to authorize disconnection of utility service to the building, structure or system in order to safely execute emergency operations or to eliminate an immediate hazard. The fire code official shall notify the serving utility and, where possible, the owner or the owner's authorized agent and the occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, then the owner, the owner's authorized agent or occupant of the building, structure or service system shall be notified in writing as soon as practical thereafter.

SECTION 112—MEANS OF APPEALS

[A] 112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the fire code official relative to the application and interpretation of this code, there shall be and is hereby created a board of appeals. The board of appeals shall be appointed by the applicable governing authority and shall hold office at its pleasure. The board shall adopt rules of procedure for conducting its business and shall render all decisions and findings in writing to the appellant with a duplicate copy to the fire code official.

[A] 112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equivalent or better form of construction is proposed. The board shall not have authority to waive requirements of this code.

[A] 112.3 Qualifications. The board of appeals shall consist of members who are qualified by experience and training on matters pertaining to the provisions of this code and are not employees of the jurisdiction.

[A] 112.4 Administration. The fire code official shall take action without delay in accordance with the decision of the board.

SECTION 113—VIOLATIONS

[A] 113.1 Unlawful acts. It shall be unlawful for a person, firm or corporation to erect, construct, alter, repair, remove, demolish or utilize a building, occupancy, premises or system regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

[A] 113.2 Owner/occupant responsibility. Correction and abatement of violations of this code shall be the responsibility of the owner or the owner's authorized agent. Where an occupant creates, or allows to be created, hazardous conditions in violation of this code, the occupant shall be held responsible for the abatement of such hazardous conditions.

[A] 113.3 Notice of violation. Where the fire code official finds a building, premises, vehicle, storage facility or outdoor area that is in violation of this code, the fire code official is authorized to prepare a written notice of violation describing the conditions deemed unsafe and, where compliance is not immediate, specifying a time for reinspection.

[A] 113.3.1 Service. A notice of violation issued pursuant to this code shall be served on the owner, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation, either by personal service, mail or by delivering the same to, and leaving it with, some person of responsibility on the premises. For unattended or abandoned locations, a copy of such notice of violation shall be posted on the premises in a conspicuous place at or near the entrance to such premises and the notice of violation shall be mailed by certified mail with return receipt requested or a certificate of mailing, to the last known address of the owner, the owner's authorized agent, or occupant.

[A] 113.3.2 Compliance with orders and notices. A notice of violation issued or served as provided by this code shall be complied with by the owner, the owner's authorized agent, operator, occupant or other person responsible for the condition or violation to which the notice of violation pertains.

[A] 113.3.3 Prosecution of violations. If the notice of violation is not complied with promptly, the fire code official is authorized to request the legal counsel of the jurisdiction to institute the appropriate legal proceedings at law or in equity to restrain, correct or abate such violation or to require removal or termination of the unlawful occupancy of the structure in violation of the provisions of this code or of the order or direction made pursuant hereto.

[A] 113.3.4 Unauthorized tampering. Signs, tags or seals posted or affixed by the fire code official shall not be mutilated, destroyed or tampered with, or removed, without authorization from the fire code official.

[A] 113.4 Violation penalties. Persons who shall violate a provision of this code or shall fail to comply with any of the requirements thereof or who shall erect, install, alter, repair or do work in violation of the approved construction documents or directive of the fire code official, or of a permit or certificate used under provisions of this code, shall be guilty of a **[SPECIFY OFFENSE]**, punishable by a fine of not more than **[AMOUNT]** dollars or by imprisonment not exceeding **[NUMBER OF DAYS]**, or both such fine and imprisonment. Each day that a violation continues after due notice has been served shall be deemed a separate offense.

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[A] 113.4.1 Abatement of violation. In addition to the imposition of the penalties herein described, the fire code official is authorized to institute appropriate action to prevent unlawful construction or to restrain, correct or abate a violation; or to prevent illegal occupancy of a structure or premises; or to stop an illegal act, conduct of business or occupancy of a structure on or about any premises.

SECTION 114—STOP WORK ORDER

[A] 114.1 Authority. Where the fire code official finds any work regulated by this code being performed in a manner contrary to the provisions of this code, or in a dangerous or unsafe manner, the fire code official is authorized to issue a stop work order.

[A] 114.2 Issuance. The stop work order shall be in writing and shall be given to the owner of the property, the owner's authorized agent or the person performing the work. Upon issuance of a stop work order, the cited work shall immediately cease. The stop work order shall state the reason for the order and the conditions under which the cited work is authorized to resume.

[A] 114.3 Emergencies. Where an emergency exists, the fire code official shall not be required to give a written notice prior to stopping the work.

[A] 114.4 Failure to comply. Any person who shall continue any work after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be subject to fines established by the authority having jurisdiction.

SECTION 115—UNSAFE STRUCTURES OR EQUIPMENT

[A] 115.1 General. If during the inspection of a premises, a structure, or any building system, in whole or in part, constitutes a clear and inimical threat to human life, safety or health, the fire code official shall issue such notice or orders to remove or remedy the conditions as shall be deemed necessary in accordance with this section, and shall refer the building to the building official for any repairs, alterations, remodeling, removing or demolition required.

[A] 115.1.1 Unsafe conditions. Structures or existing equipment that are or hereafter become unsafe, insanitary or deficient because of inadequate means of egress, inadequate light and ventilation, or that constitute a fire hazard, are otherwise dangerous to human life or the public welfare, or involve illegal or improper occupancy or inadequate maintenance, shall be deemed an unsafe condition. Unsafe structures shall be taken down and removed or made safe, as the fire code official deems necessary and as provided for in this section. A vacant structure that is not secured against unauthorized entry shall be deemed unsafe.

[A] 115.1.2 Structural hazards. Where an apparent structural hazard is caused by the faulty installation, operation or malfunction of any of the items or devices governed by this code, the fire code official shall immediately notify the building code official in accordance with Section 115.1.

[A] 115.2 Evacuation. The fire code official or the fire department official in charge of an incident shall be authorized to order the immediate evacuation of any occupied structure deemed unsafe where such structure has hazardous conditions that pose an imminent danger to structure occupants. Persons so notified shall immediately leave the structure or premises and shall not enter or reenter until authorized to do so by the fire code official or the fire department official in charge of the incident.

[A] 115.3 Record. The fire code official shall cause a report to be filed on an unsafe condition. The report shall state the occupancy of the structure and the nature of the unsafe condition.

[A] 115.4 Notice. If an unsafe condition is found, the fire code official shall serve on the owner of the structure or the owner's authorized agent a written notice that describes the condition deemed unsafe and specifies the required repairs or improvements to be made to abate the unsafe condition, or requires the unsafe structure to be demolished within a stipulated time. Such notice shall require the person thus notified to declare immediately to the fire code official acceptance or rejection of the terms of the order.

[A] 115.5 Method of service. Such notice shall be deemed properly served where a copy thereof is served in accordance with one of the following methods:

1. A copy is delivered to the owner personally.
2. A copy is sent by certified or registered mail addressed to the owner at the last known address with return receipt requested.
3. A copy is delivered in any other manner as prescribed by local law.

If the certified or registered letter is returned showing that the letter was not delivered, a copy thereof shall be posted in a conspicuous place in or about the structure affected by such notice. Service of such notice in the foregoing manner on the owner's authorized agent shall constitute service of notice on the owner.

[A] 115.6 Restoration or abatement. The structure or equipment determined to be unsafe by the fire code official is permitted to be restored to a safe condition. The owner, the owner's authorized agent, operator or occupant of a structure, premises or equipment deemed unsafe by the fire code official shall abate or cause to be abated or corrected such unsafe conditions either by repair, rehabilitation, demolition or other approved corrective action. To the extent that repairs, alterations or additions are made or a change of occupancy occurs during the restoration of the structure, such repairs, alterations, additions or change of occupancy shall comply with the requirements of Section105.1.5 and the *California Existing Building Code*.

[A] 115.7 Summary abatement. Where conditions exist that are deemed hazardous to life and property, the fire code official or fire department official in charge of the incident is authorized to abate summarily such hazardous conditions that are in violation of this code.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 2 – DEFINITIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																X							
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
Aged Home or Institution			X																				
Assembly			X																				
Atrium			X																				
Battery			X																				
Battery Types:																							
Flow battery			X																				
Hybrid supercapacitor Battery [Lithium-ion capacitor (LIC)]			X																				
Iron-air aqueous battery			X																				
Lead-Acid Battery			X																				
Lithium-ion battery			X																				
Lithium-*sulfur rechargeable* battery			X																				
Nickel-Cadmium (Ni-Cd) Battery			X																				
Nickel-Hydrogen (Ni-H_2)			X																				
Nickel-Iron (NiFe)			X																				
Nickel-Metal Hydride (Ni-MH)			X																				
Nickel-Zinc (Ni-Zn)			X																				
Sodium nickel chloride (NaNiCl)			X																				
Zinc-air aqueous battery			X																				
Zinc bromide			X																				
Zinc manganese dioxide (Zn-MnO_2)			X																				
Bedridden Person			X																				
Blasting Agent			X																				
Building			X																				
Care and Supervision			X																				
Catastrophically Injured			X																				
Cell			X																				
Cell Complex			X																				
Cell Tiers			X																				
Charter School			X																				
Child Care			X																				
Child-Care Center			X																				
Child or Children			X																				
Chronically Ill			X																				
Clinic, Outpatient			X																				
Community Care Facility			X																				

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CHAPTER 2 – DEFINITIONS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																X							
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
Community Correctional Reentry Centers			X																				
Congregate Living Health Facility (CLHF)			X																				
Congregate Residence			X																				
Courthouse Holding Facility			X																				
Courtroom Dock			X																				
Day-Care			X																				
Day-Care Home, Family			X																				
Day-Care Home, Large Family			X																				
Day-Care Home, Small Family			X																				
Day Room			X																				
Detention Elevator			X																				
Detention Treatment Room			X																				
Detoxification Facilities			X																				
Electrochemical Double Layer Capacitors (EDLCS)			X																				
Fire Appliance			X																				
Fireworks			X																				
Fixed Guideway and Passenger Rail Transit Systems			X																				
Full-Time Care			X																				
Group Home			X																				
High-Rise Building			X																				
Highway			X																				
Holding Facility			X																				
Hospitals and Psychiatric Hospitals			X																				
Housing Unit			X																				
Hydrogen Fueled Vehicles			X																				
Infant			X																				
Laboratory			X																				
Laboratory Suite			X																				
Listed			X																				
Lodging House			X																				
Mass Timber			X																				
Mechanical-Access Enclosed Parking Garage			X																				
Mobile Fueling			X																				
Mortar			X																				
Non-Accessible Area			X																				
Nonambulatory Persons			X																				
Noncombustible			X																				
Nonpatient Care Suite			X																				
Nursing Homes			X																				
Permanent Portable Building			X																				

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CHAPTER 2 – DEFINITIONS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																**X**							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
Persons With Intellectual Disabilities, Profoundly or Severely			X																				
Photovoltaic (PV) Panel System, Ground Mounted			X																				
Photovoltaic (PV) Support Structure, Elevated			X																				
Protective Social Care Facility			X																				
Proximate Audience			X																				
Railway			X																				
Relocatable Building (Public School)			X																				
Residential Care Facility for the Chronically Ill (RCF/CI)			X																				
Residential Care Facility For The Elderly (RCFE)			X																				
Residential Facility (RF)			X																				
Restraint			X																				
Roadside Hydrogen Service Vehicles			X																				
Secure Interview Rooms			X																				
Small Arms Ammunition *[T-19 §1559.19(a)]*				X																			
Small Management Yard			X																				
State-Owned/Leased Building			X																				
Tank in an Underground Area			X																				
Temporary Holding Cell, Room or Area			X													X							
Temporary Holding Facility			X																				
Tenable Environment			X																				
Tent *[T-19 §3.10(a) – (c)]*				X																			
Terminally Ill			X																				
Toddler			X																				
Waiting Room			X																				
Wildland Urban Interface Area			X																				
Winery Caves			X																				
203.2			X																				
203.2.6			X																				
203.2.10			X																				
203.3			X																				
203.4			X																				
203.4.2			X																				
203.5.1			X																				
203.7			X																				
203.7.1			X																				
203.7.2			X																				
203.7.2.2			X																				

(continued)

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CHAPTER 2 – DEFINITIONS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																X							
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
203.7.3			X																				
203.7.3.6 - 203.7.3.8			X																				
203.7.4			X																				
203.7.4.1			X																				
203.9.1			X																				
203.9.2			X																				
203.9.2.1			X																				
203.9.2.2			X																				
203.9.3			X																				
203.9.3.1			X																				
203.9.3.3			X																				
203.9.4			X																				
203.12			X																				
203.13			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

2 DEFINITIONS

User notes:

About this chapter: Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purpose of the code. General definitions are located in Section 202 and occupancy classification definitions are located in Section 203.

SECTION 201—GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *California Building Code*, *California Mechanical Code* or *California Plumbing Code*, such terms shall have the meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies. *Merriam Webster's Collegiate Dictionary, 11th Edition*, shall be considered as providing ordinarily accepted meanings.

SECTION 202—GENERAL DEFINITIONS

[BG] 24-HOUR BASIS. The actual time that a person is an occupant within a facility for the purpose of receiving care. It shall not include a facility that is open for 24 hours and is capable of providing care to someone visiting the facility during any segment of the 24 hours.

3D PRINTER. A machine used in the additive manufacturing process for fabricating objects through the deposition of a material using a print head, nozzle or other printer technology.

[M] ACCESS (TO). That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also "Ready access (to)"].

[BE] ACCESSIBLE MEANS OF EGRESS. A continuous and unobstructed way of egress travel from any accessible point in a building or facility to a public way.

[BE] ACCESSIBLE ROUTE. A continuous, unobstructed path that complies with Chapter 11 of the *California Building Code*.

ACTIVE RF EMITTING DEVICE. Any type of circuit component that requires an AC or DC power source with the ability to electrically control electron flow and/or amplification of RF signal, including but not limited to signal boosters, repeaters, bidirectional amplifiers and fiber-distributed antenna systems.

ADDITIVE MANUFACTURING. A process of joining materials to make objects from 3D model data, usually layer upon layer, sometimes referred to as 3D printing. This code recognizes two types of additive manufacturing:

Industrial additive manufacturing. 3D printing operations that typically utilize combustible powders or metals, an inert gas supply, a combustible dust collection system, or that create a hazardous (classified) location area or zone outside the equipment.

Nonindustrial additive manufacturing. 3D printing operations that do not create a hazardous (classified) location area outside the equipment and do not utilize an inert gas supply or a combustible dust collection system.

AEROSOL CONTAINER. A metal can or plastic container up to a maximum size of 33.8 fluid ounces (1000 ml) or a glass bottle up to a maximum size of 4 fluid ounces (118 ml) designed and intended to dispense an aerosol.

AEROSOL COOKING SPRAY PRODUCTS. Aerosol cooking spray products are those aerosol products designed to deliver a vegetable oil or a solid or nonflammable liquid to reduce sticking on cooking and baking surfaces, or to be applied to food, or both. These products have a chemical heat of combustion that is greater than 8600 Btu/lb. (20 kJ/g) and contain no more than 18 percent by weight of flammable propellant.

AEROSOL PRODUCT. A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.

Level 1 aerosol products. Those with a total chemical heat of combustion that is less than or equal to 8,600 British thermal units per pound (Btu/lb) (20 kJ/g).

Level 2 aerosol products. Those with a total chemical heat of combustion that is greater than 8,600 Btu/lb (20 kJ/g), but less than or equal to 13,000 Btu/lb (30 kJ/g).

Level 3 aerosol products. Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).

AEROSOL PRODUCT WAREHOUSE. A building used for warehousing aerosol products.

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***AGED HOME OR INSTITUTION**, A facility used for the housing of persons 65 years of age or older in need of care and supervision. (See definition of "care and supervision".)*

AGENCY. Any emergency responder department within the jurisdiction that utilizes radio frequencies for communication. This could include, but not be limited to, various public safety agencies such as fire departments, emergency medical services and law enforcement.

AGENT. A person who shall have charge, care or control of any structure as owner, or agent of the owner, or as executor, executrix, administrator, administratrix, trustee or guardian of the estate of the owner. Any such person representing the actual owner shall be bound to comply with the provisions of this code to the same extent as if that person was the owner.

[BG] AGRICULTURAL BUILDING. A structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products. This structure shall not be a place of human habitation or a place of employment where agricultural products are processed, treated or packaged, nor shall it be a place used by the public.

AGRO-INDUSTRIAL. A facility, or portion thereof, housing operations involving the transforming of raw agricultural products into intermediate or consumable products.

AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed automotive-type equipment into the fuel tanks of aircraft.

AIRCRAFT OPERATION AREA (AOA). Any area used or intended for use for the parking, taxiing, takeoff, landing or other ground-based aircraft activity.

[BG] AIR-INFLATED STRUCTURE. A structure that uses air-pressurized membrane beams, arches or other elements to enclose space. Occupants of such a structure do not occupy the pressurized areas used to support the structure.

AIRPORT. An area of land or structural surface that is used, or intended for use, for the landing and taking off of aircraft with an overall length greater than 39 feet (11 887 mm) and an overall exterior fuselage width greater than 6.6 feet (2012 mm), and any appurtenant areas that are used or intended for use for airport buildings and other airport facilities.

[BG] AIR-SUPPORTED STRUCTURE. A structure wherein the shape of the structure is attained by air pressure, and occupants of the structure are within the elevated pressure area. Air supported structures are of two basic types:

Double skin. Similar to a single skin, but with an attached liner that is separated from the outer skin and provides an airspace which serves for insulation, acoustic, aesthetic or similar purposes.

Single skin. Where there is only the single outer skin and the air pressure is directly against that skin.

[BE] AISLE. An unenclosed exit access component that defines and provides a path of egress travel.

[BE] AISLE ACCESSWAY. That portion of an exit access that leads to an aisle.

ALARM, NUISANCE. See "Nuisance alarm."

ALARM DEVICE, MULTIPLE STATION. See "Multiple-station alarm device."

ALARM NOTIFICATION APPLIANCE. A fire alarm system component such as a bell, horn, speaker, light or text display that provides audible, tactile or visible outputs, or any combination thereof. See also "Audible alarm notification appliance" or "Visible alarm notification appliance."

ALARM SIGNAL. A signal indicating an emergency requiring immediate action, such as a signal indicative of fire.

ALARM VERIFICATION FEATURE. A feature of automatic fire detection and alarm systems to reduce unwanted alarms wherein smoke detectors report alarm conditions for a minimum period of time, or confirm alarm conditions within a given time period, after being automatically reset, in order to be accepted as a valid alarm-initiation signal.

ALCOHOL-BASED HAND RUB. An alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands and containing ethanol or isopropanol in an amount not exceeding 95-percent by volume.

ALCOHOL-BLENDED FUELS. Flammable liquids consisting of greater than 10 percent, by volume, ethanol or other alcohols blended with gasoline.

[A] ALTERATION. Any construction or renovation to an existing structure other than a repair or addition.

[BE] ALTERNATING TREAD DEVICE. A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.

[BG] AMBULATORY CARE FACILITY. Buildings or portions thereof used to provide medical, surgical, psychiatric, nursing or similar care on a less-than-24-hour basis to persons who are rendered incapable of self-preservation by the services provided or staff has accepted responsibility for care recipients already incapable.

AMMONIUM NITRATE. A chemical compound represented by the formula NH_4NO_3.

ANNUNCIATOR. A unit containing one or more indicator lamps, alphanumeric displays or other equivalent means in which each indication provides status information about a circuit, condition or location.

[A] APPROVED. Acceptable to the fire code official.

[A] APPROVED AGENCY. An established and recognized organization that is regularly engaged in conducting tests, furnishing inspection services or furnishing product evaluation or certification where such organization has been approved by the fire code official.

[BG] AREA, BUILDING. The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.

[BE] AREA OF REFUGE. An area where persons unable to use stairways can remain temporarily to await instructions or assistance during emergency evacuation.

ARRAY. The configuration of storage. Characteristics considered in defining an array include the type of packaging, flue spaces, height of storage and compactness of storage.

ARRAY, CLOSED. A storage configuration having a 6-inch (152 mm) or smaller width vertical flue space that restricts air movement through the stored commodity.

ASSEMBLY. *The gathering together of 50 or more persons for such purposes as deliberation, education, instruction, worship, entertainment, amusement, drinking, dining or awaiting transportation.*

ATRIUM. *A vertical space that is closed at the top, connecting two or more stories in Group I-2 and I-3 occupancies or three or more stories in all other occupancies.*

[BG] ATRIUM. An opening connecting two or more stories other than enclosed stairways, elevators, hoistways, escalators, plumbing, electrical, air-conditioning or other equipment, which is closed at the top and not defined as a mall. Stories, as used in this definition, do not include balconies within assembly groups or mezzanines that comply with Section 505 of the *California Building Code*.

[BG] ATTIC. The space between the ceiling framing of the top story and the underside of the roof.

AUDIBLE ALARM NOTIFICATION APPLIANCE. A notification appliance that alerts by the sense of hearing.

AUTOMATED RACK STORAGE. Automated rack storage is a stocking method whereby the movement of pallets, products, apparatus or systems are automatically controlled by mechanical or electronic devices.

AUTOMATIC. As applied to fire protection devices, a device or system providing an emergency function without the necessity for human intervention and activated as a result of a predetermined temperature rise, rate of temperature rise or combustion products.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM. An approved system of devices and equipment which automatically detects a fire and discharges an approved fire-extinguishing agent onto or in the area of a fire.

[BE] AUTOMATIC FLUSH BOLT. Door locking hardware installed on the inactive leaf of a pair of doors, which has a bolt that is extended automatically into the door frame or floor when the active leaf is closed after the inactive leaf, and which holds the inactive leaf in a closed position. When the active leaf is opened, the automatic flush bolt retracts the bolt or rod, allowing the inactive leaf to be opened (see "Constant latching bolt," "Dead bolt," "Manual bolt").

AUTOMATIC SMOKE DETECTION SYSTEM. A fire alarm system that has initiation devices that utilize smoke detectors for protection of an area such as a room or space with detectors to provide early warning of fire.

AUTOMATIC SPRINKLER SYSTEM. An automatic sprinkler system is an integrated network of piping and fire sprinklers designed in accordance with fire protection standards.

AUTOMATIC WATER MIST SYSTEM. A system consisting of a water supply, a pressure source and a distribution piping system with attached nozzles which, at or above a minimum operating pressure, defined by its listing, discharges water in fine droplets meeting the requirements of NFPA 750 for the purpose of the control, suppression or extinguishment of a fire. Such systems include wet-pipe, dry-pipe and pre-action types. The systems are designed as engineered, preengineered, local-application or total flooding systems.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles.

AVERAGE AMBIENT SOUND LEVEL. The root mean square, A-weighted sound pressure level measured over a 24-hour period, or the time any person is present, whichever time period is less.

[BG] AWNING. An architectural projection that provides weather protection, identity or decoration and is partially or wholly supported by the building to which it is attached. An awning is comprised of a lightweight frame structure over which a covering is attached.

[BE] BALANCED DOOR. A door equipped with double-pivoted hardware so designed as to cause a semicounter balanced swing action when opening.

BALED COTTON. See "Cotton."

BALED COTTON, DENSELY PACKED. See "Cotton."

BARRICADE. A structure that consists of a combination of walls, floor and roof, which is designed to withstand the rapid release of energy in an explosion and which is fully confined, partially vented or fully vented; or other effective method of shielding from explosive materials by a natural or artificial barrier.

Artificial barricade. An artificial mound or revetment with a minimum thickness of 3 feet (914 mm).

Natural barricade. Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures that require protection cannot be seen from the magazine or building containing explosives when the trees are bare of leaves.

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BARRICADED. The effective screening of a building containing explosive materials from the magazine or other building, railway or highway by a natural or an artificial barrier. A straight line from the top of any sidewall of the building containing explosive materials to the eave line of any magazine or other building or to a point 12 feet (3658 mm) above the center of a railway or highway shall pass through such barrier.

[BG] BASEMENT. A story that is not a story above grade plane.

BATTERY. *A class of devices that contain materials that convert chemical energy into electrical energy which then can be used as a power source. There are several technologies that utilize a variety of materials and chemistries for the purpose of storing this electrochemical energy for use when required.*

BATTERY SYSTEM, STATIONARY STORAGE. A rechargeable energy storage system consisting of electrochemical storage batteries, battery chargers, controls and associated electrical equipment designed to provide electrical power to a building. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

BATTERY TYPES. For the purposes of this code, certain types are defined as follows:

Flow battery. A type of storage battery that includes chemical components dissolved in two different liquids. Ion exchange, which provides the flow of electrical current, occurs through the membrane while both liquids circulate in their respective spaces. *(Includes vanadium redox, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.)*

Hybrid supercapacitor battery [lithium-ion capacitor (LIC)]. *The lithium-ion capacitor (LIC or LiC) is a hybrid type of capacitor classified as a type of supercapacitor. It combines lithium-ion technology and electric double layer capacitor (EDLC) construction. It is called a hybrid because the anode is the same as those used in lithium-ion batteries and the cathode is the same as those used in supercapacitors. Activated carbon is typically used as the cathode. The anode of the LIC consists of carbon material which is often pre-doped with lithium ions.*

Iron-air aqueous battery. *The battery includes iron and air electrodes. Each of the cells are filled with water-based, nonflammable alkaline electrolyte (which functions partially like the anolytes and catholytes of flow batteries. The battery does not present the risk of thermal runaway. Like the Ni-Fe battery they are relatively coulombically inefficient on float charge, and thus are usually disconnected from the charge bus when at or nearing full charge.*

Lead-acid battery. *An aqueous* storage battery that is comprised of lead electrodes *(lead dioxide is the active material for the positive anode and metallic lead is the active material for the negative cathode),* immersed in a solution of water and sulfuric acid electrolyte. *Common major classification distinctions (i.e., types) include vented lead-acid (VLA) and valve-regulated lead-acid (VRLA). The VRLA is further subdivided into two types representing the method in which the electrolyte is immobilized: either gelled (gel cell) or absorbed in finely-woven porous fiberglass mat (AGM) separators inside the battery between the electrodes.*

Lithium-ion battery. A storage battery with lithium ions serving as the charge carriers of the battery. The electrolyte is a polymer mixture of carbonates with *flammable organic* salt in a liquid form. Lithiated metal *or mixed metal* oxides *[e.g. cobalt (LCO), manganese (LMO), nickel-manganese-cobalt (NMC or NCM), nickel-cobalt-aluminum (NCA) or iron phosphate (LFP)]* typically *make up the* cathode and forms of carbon or graphite *[or lithium titanate oxide (LTO)]* typically form the anode. *Each of these different types of cathodes and anode combinations produce different energy densities, different lifetimes, differing fast charge abilities, and differing safety characteristics, among many other things. The choice of Li-ion chemistry is often driven by whichever of these factors or the best mix of factors is/are most important for the application.*

Lithium-*sulfur rechargeable* battery. A storage battery that is similar to the lithium-ion battery except that it has a lithium metal anode in the place of the traditional carbon or graphite anode. *A lithium-sulfur battery is a secondary (rechargeable) battery that has lithium metal at the anode, sulfur at the cathode, and the electrolyte is nonaqueous.*

Nickel-cadmium (Ni-Cd) battery. An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode contains cadmium and the electrolyte is a solution of water and potassium hydroxide. *They lose less life at high temperatures and have better capacity at low temperatures than most other battery technologies, and have a long life if not cycled too much.*

Nickel-hydrogen (NiH_2). *The cells are a hybrid technology, combining elements from both batteries and fuel cells. The battery differs from a nickel–metal hydride (NiMH) battery by the use of hydrogen in gaseous form The nickel–hydrogen cells utilize the nickel hydroxide electrode from nickel–cadmium cells and a platinum hydrogen electrode from fuel cell technology to create a chemistry without the issues and limitations inherent with the cadmium electrode. The cell is contained within a hermetically sealed pressure vessel that envelopes the electrodes and accommodates the pressurized hydrogen.*

Nickel Iron (Ni-Fe). *The battery has nickel(III) oxide-hydroxide positive plates and iron negative plates, with an electrolyte of potassium hydroxide. The active materials are held in nickel-plated steel tubes or perforated pockets. Nickel-iron batteries do not cause spill concerns since there is no acid in the component. They are capable of tens of thousands of cycles and have calendar lifetimes of well over 50 years. However, they are highly coulombically inefficient (with the inefficiency coming from high percentages of water electrolysis from the charging current) when at or near full state-of-charge (SOC). As such, they are usually equipped with catalytic recombiner vents and automatic watering systems.*

Nickel-metal hydride (Ni-MH). An alkaline storage battery in which the positive active material is nickel oxide, the negative electrode is an intermetallic compound and the electrolyte is usually potassium hydroxide *solution in water.*

Nickel-Zinc (Ni-Zn). *A battery that is chemically similar to the nickel-metal hydride battery. Nickel and zinc have low toxicity, the battery is nonflammable, and presents no threat to the environment. The Ni-Zn battery uses an alkaline electrolyte (potassium hydroxide, KOH) and zinc acts as the negative electrode while nickel hydroxide is the positive electrode.*

Sodium nickel chloride (NaNiCl). *This battery is a member of the "high temperature" family. which works at a typical temperature scope of 270°C–350°C. Its cell contains sodium and nickel chloride electrodes, isolated by a beta-alumina electrolyte, which can conduct sodium particles yet not electrons. This chemistry is much safer than most battery chemistries with far fewer toxic materials involved in its production, but it does not have the cycling ability or energy density of most of the Li-ion chemistries.*

Zinc-air aqueous battery. *A zinc–air battery contains a zinc electrode and porous air electrode separated by a membrane and an aqueous alkaline electrolyte that is used in a manner similar to the catholyte and analytes of a flow battery. The cathode is a bi- functional air electrode which features one or more catalysts that can perform the oxygen reduction reaction (ORR) during discharging and the oxygen evolution reaction (OER) during charging.*

Zinc bromide. *In zinc bromide batteries, the cathode is made using zinc instead of lithium. The electrolyte is water-based and, therefore, does not pose a fire risk.*

Zinc manganese dioxide (Zn-MnO_2). *The battery features a Zinc (Zn) anode and a dioxide (MnO_2) cathode with a strongly basic electrolyte (typically potassium hydroxide, KOH), The battery does not present environmental hazards and is EPA-certified for landfill disposal in the United States, and the aqueous electrolyte is nonflammable.*

BEDRIDDEN PERSON. *A person, requiring assistance in turning and repositioning in bed, or being unable to independently transfer to and from bed, except in facilities with appropriate and sufficient care staff, mechanical devices if necessary, and safety precautions as determined in Title 22 regulations, by the Director of Social Services or his or her designated representative. Persons who are unable to independently transfer to and from bed, but who do not need assistance to turn or reposition in bed, shall be considered nonambulatory.*

The Director of Social Services or his or her designated representative shall make the determination of the bedridden status of persons with developmental disabilities, in consultation with the Director of Developmental Services or his or her designated representative.

The Director of Social Services or his or her designated representative shall make the determination of the bedridden status of all other persons with disabilities who are not developmentally disabled.

BIN BOX. A five-sided container with the open side facing an aisle. Bin boxes are self-supporting or supported by a structure designed so that little or no horizontal or vertical space exists around the boxes.

BIOMASS. Plant- or animal-based material of biological origin excluding material embedded in geologic formations or transformed into fossils.

BLAST AREA. The area including the blast site and the immediate adjacent area within the influence of flying rock, missiles and concussion.

BLAST SITE. The area in which explosive materials are being or have been loaded and which includes all holes loaded or to be loaded for the same blast and a distance of 50 feet (15 240 mm) in all directions.

BLASTER. A person qualified in accordance with Section 5601.4 to be in charge of and responsible for the loading and firing of a blast.

BLASTING AGENT. *Any material or mixture, consisting of a fuel and oxidizer, intended for blasting, not otherwise classified as an explosive and in which none of the ingredients are classified as an explosive, provided that the finished product, as mixed and packaged for use or shipment, cannot be detonated by means of a No. 8 test blasting cap when unconfined.*

1. *A No. 8 test blasting cap is one containing 2 grams of a mixture of 80% mercury fulminate and 20% potassium chlorate, or a cap of equivalent strength.*
2. *Nitro-Carbo-Nitrates shall mean any blasting agent which has been classified as nitro-carbo-nitrate by the US DOTn, and which is packaged and shipped in compliance with the regulations of the US DOTn.*

[BE] BLEACHERS. Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see "Grandstand").

[BG] BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

BOILING POINT. The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch absolute (psia) (101 kPa) or 760 mm of mercury. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for the purposes of this classification, the 20-percent evaporated point of a distillation performed in accordance with ASTM D86 shall be used as the boiling point of the liquid.

BONFIRE. An outdoor fire utilized for ceremonial purposes.

[BE] BREAKOUT. For revolving doors, a process whereby wings or door panels can be pushed open manually for means of egress travel.

BRITISH THERMAL UNIT (BTU). The heat necessary to raise the temperature of 1 pound (0.454 kg) of water by 1°F (0.5565°C).

[A] BUILDING. Any structure utilized or intended for supporting or sheltering any occupancy.

Note: *Building shall have the same meaning as defined in Health and Safety Code Sections 17920 and 18908 for the applications specified in Section 1.11.*

BUILDING AREA. See "Area, building."

BUILDING HEIGHT. See "Height, building."

[A] BUILDING OFFICIAL. The officer or other designated authority charged with the administration and enforcement of the *California Building Code*, or a duly authorized representative.

BULK OXYGEN SYSTEM. An assembly of equipment, such as oxygen storage containers, pressure regulators, safety devices, vaporizers, manifolds and interconnecting piping, that has a storage capacity of more than 20,000 cubic feet (566 m^3) of oxygen at *normal temperature and pressure (NTP)* including unconnected reserves on hand at the site. The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen containers can be stationary or movable, and the oxygen can be stored as a gas or liquid.

BULK PLANT OR TERMINAL. That portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

BULK TRANSFER. The loading or unloading of flammable or combustible liquids from or between tank vehicles, tank cars or storage tanks.

BULLET RESISTANT. Constructed so as to resist penetration of a bullet of 150-grain M2 ball ammunition having a nominal muzzle velocity of 2,700 feet per second (fps) (824 mps) when fired from a 30-caliber rifle at a distance of 100 feet (30 480 mm), measured perpendicular to the target.

CANOPY. A structure or architectural projection of rigid construction over which a covering is attached that provides weather protection, identity or decoration, and may be structurally independent or supported by attachment to a building on one end and by not less than one stanchion on the outer end.

CAPACITOR ENERGY STORAGE SYSTEM. A stationary, rechargeable energy storage system consisting of capacitors, chargers, controls and associated electrical equipment designed to provide electrical power to a building or facility. The system is typically used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities.

CARBON DIOXIDE ENRICHMENT SYSTEM. A system where carbon dioxide gas is intentionally introduced into an indoor environment, typically for the purpose of stimulating plant growth.

CARBON DIOXIDE EXTINGUISHING SYSTEM. A system supplying carbon dioxide (CO_2) from a pressurized vessel through fixed pipes and nozzles. The system includes a manual- or automatic-actuating mechanism.

CARBON MONOXIDE ALARM. A single- or multiple-station alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

CARBON MONOXIDE DETECTOR. A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

CARBON MONOXIDE SOURCE. A piece of commonly used equipment or permanently installed appliance, fireplace or process that produces or emits carbon monoxide gas.

CARE AND SUPERVISION. *Any one or more of the following activities provided by a person or facility to meet the needs of the clients:*

1. *Assistance in dressing, grooming, bathing and other personal hygiene.*
2. *Assistance with taking medication.*
3. *Central storing and/or distribution of medications.*
4. *Arrangement of and assistance with medical and dental care.*
5. *Maintenance of house rules for the protection of clients.*
6. *Supervision of client schedules and activities.*
7. *Maintenance and/or supervision of client cash resources or property.*
8. *Monitoring food intake or special diets.*
9. *Providing basic services required by applicable law and regulation to be provided by the licensee in order to obtain and maintain a community-care facility license.*

[BG] CARE SUITE. In Group I-2 occupancies, a group of treatment rooms, care recipient sleeping rooms and the support rooms or spaces and circulation space within the suite where staff are in attendance for supervision of all care recipients within the suite, and the suite is in compliance with the requirements of Section 407.4.4 of the *California Building Code*.

CARTON. A cardboard or fiberboard box enclosing a product.

CATASTROPHICALLY INJURED. *As termed, means a person whose origin of disability was acquired through trauma or nondegenerative neurologic illness, for whom it has been determined by the Department of Health Services Certification and Licensing that active rehabilitation would be beneficial.*

CEILING LIMIT. The maximum concentration of an airborne contaminant to which one may be exposed. The ceiling limits utilized are those published in DOL 29 CFR Part 1910.1000. The ceiling Recommended Exposure Limit (REL-C) concentrations published by the US National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Ceiling (TLV-C) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Ceiling Workplace Environmental Exposure Level (WEEL-Ceiling) Guides published by the American Industrial Hygiene Association (AIHA), and other approved, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

CELL. *(Detention or correctional facility). A sleeping or housing unit in a detention or correctional facility for the confinement of not more than two inmates or prisoners.*

CELL COMPLEX. *A cluster or group of cells or dormitories in a jail, prison or other detention facility, together with rooms used for accessory purposes, all of which open into the cell complex, and are used for functions such as dining, counseling, exercise, classrooms, sick call, visiting, storage, staff offices, control rooms or similar functions, and interconnecting corridors all within the cell complex.*

CELL TIERS. *Cells, dormitories and accessory spaces. Cell tiers are located one level above the other, and do not exceed two levels per floor. A cell tier shall not be considered a story or mezzanine.*

[A] CHANGE OF OCCUPANCY. Either of the following shall be considered as a change of occupancy where this code requires a greater degree of safety, accessibility, structural strength, fire protection, means of egress, ventilation or sanitation than is existing in the current building or structure:

1. Any change in the occupancy classification of a building or structure.
2. Any change in the purpose of, or a change in the level of activity within, a building or structure.

CHARTER SCHOOL. *A Charter School is a public school providing instruction from kindergarten through 12th grade, established pursuant to Education Code, Title 2, Division 4, Part 26.8, Section 47600, et seq.*

CHEMICAL. An element, chemical compound or mixture of elements or compounds or both.

CHEMICAL FUME HOOD. A ventilated enclosure designed to contain and exhaust fumes, gases, vapors, mists and particulate matter generated within the hood.

CHEMICAL NAME. The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry, the Chemical Abstracts Service rules of nomenclature, or a name which will clearly identify a chemical for the purpose of conducting an evaluation.

CHILD-CARE CENTER. *Any facility of any capacity other than a large or small family day-care home as defined in these regulations in which less than 24-hour-per-day nonmedical supervision is provided for children in a group setting.*

CHILD CARE. *For the purposes of these regulations, means the care of children during any period of a 24-hour day where permanent sleeping accommodations are not provided. The time-period shall not be more than 24 hours. Note: "Child care" shall not be construed to preclude the use of cots or mats for napping purposes, provided all employees, attendants and staff personnel are awake and on duty in the area where napping occurs.*

CHILD OR CHILDREN. *A person or persons under the age of 18 years.*

[M] CHIMNEY. A primarily vertical structure containing one or more flues for the purpose of carrying gaseous products of combustion and air from a fuel-burning appliance to the outdoor atmosphere.

Factory-built chimney. A listed and labeled chimney composed of factory-made components, assembled in the field in accordance with manufacturer's instructions and the conditions of the listing.

Masonry chimney. A field-constructed chimney composed of solid masonry units, bricks, stones, or concrete.

Metal chimney. A field-constructed chimney of metal.

CHRONICALLY ILL. *See "Terminally ill."*

[BE] CIRCULATION PATH. An exterior or interior way of passage from one place to another for pedestrians.

CLEAN AGENT. Electrically nonconducting, volatile or gaseous fire extinguishant that does not leave a residue upon evaporation.

[BG] CLINIC, OUTPATIENT. Buildings or portions thereof used to provide medical care on a less-than-24-hour basis to persons who are not *classified as nonambulatory or bedridden or* rendered incapable of self-preservation by the services provided.

CLOSED CONTAINER. A container sealed by means of a lid or other device such that liquid, vapor or dusts will not escape from it under ordinary conditions of use or handling.

CLOSED SYSTEM. The use of a solid or liquid hazardous material involving a closed vessel or system that remains closed during normal operations where vapors emitted by the product are not liberated outside of the vessel or system and the product is not exposed to the atmosphere during normal operations; and all uses of compressed gases. Examples of closed systems for solids and liquids include product conveyed through a piping system into a closed vessel, system or piece of equipment.

COLD DECK. A pile of unfinished cut logs.

COMBUSTIBLE DUST. Finely divided solid material which is 420 microns or less in diameter and which, when dispersed in air in the proper proportions, could be ignited by a flame, spark or other source of ignition. Combustible dust will pass through a US No. 40 standard sieve.

COMBUSTIBLE FIBERS. Readily ignitable and free-burning materials in a fibrous or shredded form, such as cocoa fiber, cloth, cotton, excelsior, hay, hemp, henequen, istle, jute, kapok, oakum, rags, sisal, Spanish moss, straw, tow, wastepaper, certain synthetic fibers or other like materials. This definition does not include densely packed baled cotton.

COMBUSTIBLE GAS DETECTOR. An instrument that samples the local atmosphere and indicates the presence of ignitable vapors or gases within the flammable or explosive range expressed as a volume percent in air.

COMBUSTIBLE LIQUID. A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:

The category of combustible liquids does not include compressed gases or cryogenic fluids or liquids that do not have a fire point when tested in accordance with ASTM D92.

Class II. Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).

Class IIIA. Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB. Liquids having closed cup flash points at or above 200°F (93°C).

[M] COMMERCIAL COOKING APPLIANCES. Appliances used in a commercial food service establishment for heating or cooking food. For the purpose of this definition, a commercial food service establishment is where food is prepared for sale or is prepared on a scale that is by volume and frequency not representative of domestic household cooking.

COMMERCIAL MOTOR VEHICLE. A motor vehicle used to transport passengers or property where the motor vehicle:

1. Has a gross vehicle weight rating of 10,000 pounds (454 kg) or more; or
2. Is designed to transport 16 or more passengers, including the driver.

COMMODITY. A combination of products, packing materials and containers.

[BE] COMMON PATH OF EGRESS TRAVEL. That portion of exit access travel distance measured from the most remote point of each room, area or space to that point where the occupants have separate and distinct access to two exits or exit access doorways.

[BE] COMMON USE. Interior or exterior circulation paths, rooms, spaces or elements that are not for public use and are made available for the shared use of two or more people.

COMMUNITY CARE FACILITY. *Community care facility means any facility, place or building that is maintained and operated to provide nonmedical residential care, day treatment, adult day care or agency services for children, adults or children and adults, including, but not limited to, the physically handicapped, mentally impaired, incompetent persons, and abused or neglected children, and includes but is not limited to the following as defined in Health and Safety Code Section 1502:*

1. *Residential facility.*
2. *Adult day program.*
3. *Therapeutic day services facility.*
4. *Social rehabilitation facility.*
5. *Community treatment facility.*
6. *Full-service adoption agency.*
7. *Transitional shelter care facility.*
8. *Transitional housing placement facility.*

COMMUNITY CORRECTIONAL REENTRY CENTERS—California Department of Corrections and Rehabilitation (CDCR)—*community-located facilities that provide housing and transitional rehabilitative or community-based programing services for ambulatory inmates. CDCR Program services assist with substance use disorder treatment, employment, education, family reunification and social support. Program participants remain under the jurisdiction of CDCR, are monitored by CDCR staff and supervised by CDCR, approved/contracted program providers 24/7. The facilities include residential living, food services, administrative and program functional spaces in a nonlicensed 24-hour facility.*

COMPRESSED GAS. A material, or mixture of materials that:

1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure; and
2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases which have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C).

The states of a compressed gas are categorized as follows:

1. Nonliquefied compressed gases are gases, other than those in solution, which are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C).
2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C).
3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent.
4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.

COMPRESSED GAS CONTAINER. A pressure vessel designed to hold compressed gases at pressures greater than one atmosphere at 68°F (20°C) and includes cylinders, containers and tanks.

COMPRESSED GAS SYSTEM. An assembly of equipment designed to contain, distribute or transport compressed gases. It can consist of a compressed gas container or containers, reactors and appurtenances, including pumps, compressors and connecting piping and tubing.

CONGREGATE LIVING HEALTH FACILITY (CLHF). *As defined in Health and Safety Code Section 1250.*

(1) A residential home with a capacity, except as provided in paragraph (4), of no more than 18 beds, that provides inpatient care, including the following basic services: medical supervision, 24-hour skilled nursing and supportive care, pharmacy, dietary, social, recreational and at least one type of service specified in paragraph (2). The primary need of congregate living health facility residents shall be for availability of skilled nursing care on a recurring, intermittent, extended or continuous basis. This care is generally less intense than that provided in general acute care hospitals but more intense than that provided in skilled nursing facilities.

(2) Congregate living health facilities shall provide one of the following services:

(A) Services for persons who are mentally alert, persons with physical disabilities, who may be ventilator dependent.

(B) Services for persons who have a diagnosis of terminal illness, a diagnosis of a life-threatening illness or both. Terminal illness means the individual has a life expectancy of six months or less as stated in writing by his or her attending physician and surgeon. A "life-threatening illness" means the individual has an illness that can lead to a possibility of a termination of life within five years or less as stated in writing by his or her attending physician and surgeon.

(C) Services for persons who are catastrophically and severely disabled. A person who is catastrophically and severely disabled means a person whose origin of disability was acquired through trauma or nondegenerative neurologic illness, for whom it has been determined that active rehabilitation would be beneficial and to whom these services are being provided. Services offered by a congregate living health facility to a person who is catastrophically disabled shall include, but not be limited to, speech, physical and occupational therapy.

(3) A congregate living health facility license shall specify which of the types of persons described in paragraph (2) to whom a facility is licensed to provide services.

(4)(A) A facility operated by a city and county for the purposes of delivering services under this section may have a capacity of 59 beds.

(B) A congregate living health facility not operated by a city and county servicing persons who are terminally ill, persons who have been diagnosed with a life-threatening illness or both, that is located in a county with a population of 500,000 or more persons, or located in a county of the 16th class pursuant to Section 28020 of the Government Code, may have not more than 25 beds for the purpose of serving persons who are terminally ill.

(C) A congregate living health facility not operated by a city and county serving persons who are catastrophically and severely disabled, as defined in subparagraph (C) of paragraph (1) that is located in a county of 500,000 or more persons may have not more than 12 beds for the purpose of serving persons who are catastrophically and severely disabled.

(5) A congregate living health facility shall have a noninstitutional, homelike environment.

CONGREGATE RESIDENCE. *Any building or portion thereof that contains facilities for living, sleeping and sanitation, as required by this code, and may include facilities for eating and cooking, for occupancy by other than a family. A congregate residence may be a shelter, convent, monastery, dormitory, fraternity or sorority house, but does not include jails, hospitals, nursing homes, hotels or lodging houses.*

[BG] COMPUTER ROOM. A room or portions of a building used primarily to house information technology equipment (ITE) and serving an ITE load less than or equal to 10 kW or 20 W/ft^2 (215 W/m^2) of conditioned floor area.

[BG] CONGREGATE LIVING FACILITIES. A building or part thereof that contains sleeping units where residents share bathroom and/or kitchen facilities.

[BE] CONSTANT LATCHING BOLT. Door locking hardware installed on the inactive leaf of a pair of doors, which has a bolt that automatically latches into the door frame or the floor, and which holds the inactive leaf in a closed position. The latch bolt is retracted manually to allow the inactive leaf to be opened.

CONSTANTLY ATTENDED LOCATION. A designated location at a facility staffed by trained personnel on a continuous basis where alarm or supervisory signals are monitored and facilities are provided for notification of the fire department or other emergency services.

[A] CONSTRUCTION DOCUMENTS. The written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a permit.

CONTAINER. A vessel of 60 gallons (227 L) or less in capacity used for transporting or storing hazardous materials. Pipes, piping systems, engines and engine fuel tanks are not considered to be containers.

CONTAINMENT SYSTEM. A gastight recovery system comprised of equipment or devices which can be placed over a leak in a compressed gas container, thereby stopping or controlling the escape of gas from the leaking container.

CONTAINMENT VESSEL. A gastight recovery vessel designed so that a leaking compressed gas container can be placed within its confines thereby encapsulating the leaking container.

CONTROL AREA. Spaces within a building where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, dispensed, used or handled. See also the definition of "Outdoor control area."

[BE] CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel.

CORRIDOR, OPEN-ENDED. See "Open-ended corridor."

CORROSIVE. A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.

COTTON.

Baled cotton. A natural seed fiber wrapped in and secured with industry-accepted materials, usually consisting of burlap, woven polypropylene, polyethylene or cotton or sheet polyethylene, and secured with steel, synthetic or wire bands, or wire; also includes linters (lint removed from the cottonseed) and motes (residual materials from the ginning process).

Baled cotton, densely packed. Cotton, made into banded bales, with a packing density of not less than 22 pounds per cubic foot (360 kg/m^3), and dimensions complying with the following: a length of 55 inches (1397 mm), a width of 21 inches (533.4 mm) and a height of 27.6 to 35.4 inches (701 to 899 mm).

Seed cotton. Perishable raw agricultural commodity consisting of cotton fiber (lint) attached to the seed of the cotton plant, which requires ginning to become a commercial product.

[BG] COURT. An open, uncovered space, unobstructed to the sky, bounded on three or more sides by exterior building walls or other enclosing devices.

COURTHOUSE HOLDING FACILITY. [SFM] *Courthouse Holding Facility shall mean a room, cell, cell complex or building for the confinement of persons for the purpose of a court appearance for a period not to exceed 12 hours.*

COURTROOM DOCK. *Courtroom Dock shall mean an area within a courtroom where persons may be restrained and are awaiting court proceedings.*

[BG] COVERED MALL BUILDING. A single building enclosing a number of tenants and occupants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, passenger transportation terminals, offices, and other similar uses wherein two or more tenants have a main entrance into one or more malls. Anchor buildings shall not be considered as a part of the covered mall building. The term "covered mall building" shall include open mall buildings as defined below.

Mall. A roofed or covered common pedestrian area within a covered mall building that serves as access for two or more tenants and not to exceed three levels that are open to each other. The term "mall" shall include open malls as defined below.

Open mall. An unroofed common pedestrian way serving a number of tenants not exceeding three levels. Circulation at levels above grade shall be permitted to include open exterior balconies leading to *exits* discharging at grade.

Open mall building. Several structures housing a number of tenants such as retail stores, drinking and dining establishments, entertainment and amusement facilities, offices, and other similar uses wherein two or more tenants have a main entrance into one or more open malls. Anchor buildings are not considered as a part of the open mall building.

CRITICAL AREAS. Areas that are designated for the highest level of emergency responder radio coverage including but not limited to areas such as exit stairs, exit passageways, elevator lobbies, fire protection equipment room and control valve locations, and fire command centers.

CRITICAL CIRCUIT. A circuit that requires continuous operation to ensure safety of the structure and occupants.

CRYOGENIC CONTAINER. A cryogenic vessel of any size used for the transportation, handling or storage of cryogenic fluids.

CRYOGENIC FLUID. A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).

CRYOGENIC VESSEL. A pressure vessel, low-pressure tank or atmospheric tank designed to contain a cryogenic fluid on which venting, insulation, refrigeration or a combination of these is used in order to maintain the operating pressure within the design pressure and the contents in a liquid phase.

CURRENT TAP. An electrical device that, where connected to a permanently installed receptacle outlet, provides multiple receptacle outlet configurations.

[BG] CUSTODIAL CARE. Assistance with day-to-day living tasks; such as assistance with cooking, taking medication, bathing, using toilet facilities and other tasks of daily living. Custodial care includes persons receiving care who have the ability to respond to emergency situations and evacuate at a slower rate and/or who have mental and psychiatric complications.

CYLINDER. A pressure vessel designed for pressures higher than 40 psia (275.6 kPa) and having a circular cross section. It does not include a portable tank, multiunit tank car tank, cargo tank or tank car.

DAMPER. See "Fire damper" and "Smoke damper."

DATA CENTER. A room or building, or portions thereof, used primarily to house information technology equipment (ITE) and serving a total ITE load greater than 10 kW and 20 W/ft^2 (215 W/m^2) of conditioned floor area.

DAY BOX. A portable magazine designed to hold explosive materials and constructed in accordance with the requirements for a Type 3 magazine as defined and classified in Chapter 56.

DAY-CARE. *For the purposes of these regulations, shall mean the care of persons during any period of a 24-hour day where permanent sleeping accommodations are not provided. The time period shall not be more than 24 hours.*

Note: *"Day-care" shall not be construed to preclude the use of cots or mats for napping purposes, provided all employees, attendants and staff personnel are awake and on duty in the area where napping occurs.*

DAY-CARE HOME, FAMILY. *A home that regularly provides care, protection and supervision for 14 or fewer children, in the provider's own home, for periods of less than 24 hours per day, while the parents or guardians are away, and is either a large family day-care home or a small family day-care home.*

DAY-CARE HOME, LARGE FAMILY. *A provider's own home licensed to provide day care for periods less than 24-hours per day for nine to 14 persons, including children under the age of 10 years who reside at the home.*

DAY-CARE HOME, SMALL FAMILY. *A home which provides family day-care to eight or fewer children, including children under the age of 10 years who reside at the home, in the provider's own home, for periods of less than 24 hours per day. Small family day-care homes are exempted from state fire and life safety regulations other than those state and local standards applicable to Group R-3 occupancies. (See Health and Safety Code, Section 13143 (b).)*

DAY ROOM. *A room which is adjacent to a cell, or cell tier or dormitory and which is used as a dining, exercise or other activity room for inmates.*

[BE] DEAD BOLT. Door locking hardware with a bolt that is extended and retracted by action of the lock mechanism (see "Automatic flush bolt," "Constant latching bolt," "Manual bolt").

DECORATIVE MATERIALS. All materials applied over the building interior finish for decorative, acoustical or other effect, including but not limited to curtains, draperies, fabrics, streamers and all other materials utilized for decorative effect, including but not limited to bulletin boards, artwork, posters, photographs, paintings, batting, cloth, cotton, hay, stalks, straw, vines, leaves, trees, moss and similar items, foam plastics and materials containing foam plastics. Decorative materials do not include wall coverings, ceiling coverings, floor coverings, ordinary window shades, interior finish and materials 0.025 inch (0.64 mm) or less in thickness applied directly to and adhering tightly to a substrate.

[BE] DEFEND-IN-PLACE. A method of emergency response that engages building components and trained staff to provide occupant safety during an emergency. Emergency response involves remaining in place, relocating within the building, or both, without evacuating the building.

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DELIVERED AUDIO QUALITY (DAQ). A measure of audio quality over a transmission medium. This metric is often used to quantify the quality of audio heard over a radio system. DAQ levels are defined by the following scale:

DAQ 1 = unusable. Speech is present but not understandable.

DAQ 2 = speech is understandable with considerable effort. Requires frequent repetition due to noise or distortion.

DAQ 3 = speech understandable with slight effort. Requires occasional repetition due to noise or distortion.

DAQ 3.4 = speech understandable without repetition. Some noise or distortion present.

DAQ 4 = speech easily understandable. Little noise or distortion.

DAQ 5 = perfect. No distortion or noise discernible.

DELUGE SYSTEM. A sprinkler system employing open sprinklers attached to a piping system connected to a water supply through a valve that is opened by the operation of a detection system installed in the same area as the sprinklers. When this valve opens, water flows into the piping system and discharges from all sprinklers attached thereto.

DESIGN PRESSURE. The maximum gauge pressure that a pressure vessel, device, component or system is designed to withstand safely under the temperature and conditions of use expected.

DESOLVENTIZING. The act of removing a solvent from a material.

DETACHED BUILDING. A separate single-story building, without a basement or crawl space, used for the storage or use of hazardous materials and located an approved distance from all structures.

DETEARING. A process for rapidly removing excess wet coating material from a dipped or coated object or material by passing it through an electrostatic field.

DETECTOR, HEAT. A fire detector that senses heat, either abnormally high temperature or rate of rise, or both.

DETENTION ELEVATOR. [SFM] *Detention Elevator shall mean an elevator which moves in-custody individuals within a secure and restrained environment.*

DETENTION TREATMENT ROOM. [SFM] *Detention Treatment Room shall mean a lockable room or rooms within Group I-3 occupancies used for recreational therapy, group rooms, interdisciplinary treatment team rooms and interview rooms not classified solely as a Group I-2 occupancy.*

DETONATING CORD. A flexible cord containing a center core of high explosive used to initiate other explosives.

DETONATION. An exothermic reaction characterized by the presence of a shock wave in the material which establishes and maintains the reaction. The reaction zone progresses through the material at a rate greater than the velocity of sound. The principal heating mechanism is one of shock compression. Detonations have an explosive effect.

DETONATOR. A device containing any initiating or primary explosive that is used for initiating detonation. A detonator shall not contain more than 154.32 grains (10 grams) of total explosives by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors, and noninstantaneous and delay blasting caps which use detonating cord, shock tube or any other replacement for electric leg wires. All types of detonators in strengths through No. 8 cap should be rated at $1^1/_2$ pounds (0.68 kg) of explosives per 1,000 caps. For strengths higher than No. 8 cap, consult the manufacturer.

[BG] DETOXIFICATION FACILITIES. Facilities that provide treatment for substance abuse serving care recipients who are incapable of self-preservation *or classified as nonambulatory or bedridden* or who are harmful to themselves or others.

DIP TANK. A tank, vat or container of flammable or combustible liquid in which articles or materials are immersed for the purpose of coating, finishing, treating and similar processes.

DISCHARGE SITE. The immediate area surrounding the fireworks mortars used for an outdoor fireworks display.

DISPENSING. The pouring or transferring of any material from a container, tank or similar vessel, whereby vapors, dusts, fumes, mists or gases are liberated to the atmosphere.

DISPENSING DEVICE, OVERHEAD TYPE. A dispensing device that consists of one or more individual units intended for installation in conjunction with each other, mounted above a dispensing area typically within the motor fuel-dispensing facility canopy structure, and characterized by the use of an overhead hose reel.

➡ **DOOR, BALANCED.** See "Balanced door."

DOOR, DUTCH. See "Dutch door."

DOOR, LOW-ENERGY POWER-OPERATED. See "Low-energy power-operated door."

DOOR, POWER-ASSISTED. See "Power-assisted door."

DOOR, POWER-OPERATED. See "Power-operated door."

DOORWAY, EXIT ACCESS. See "Exit access doorway."

[BG] DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

DOWNLINK. The signal from the base station/tower site to the portable radio or device.

DRAFT CURTAIN. A structure arranged to limit the spread of smoke and heat along the underside of the ceiling or roof.

[BF] DRAFTSTOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and attics.

DRY CLEANING. The process of removing dirt, grease, paints and other stains from such items as wearing apparel, textiles, fabrics and rugs by use of nonaqueous liquids (solvents).

DRY CLEANING PLANT. A facility in which dry cleaning and associated operations are conducted, including the office, receiving area and storage rooms.

DRY CLEANING ROOM. An occupiable space within a building used for performing dry cleaning operations, the installation of solvent-handling equipment or the storage of dry cleaning solvents.

DRY CLEANING SYSTEM. Machinery or equipment in which textiles are immersed or agitated in solvent or in which dry cleaning solvent is extracted from textiles.

DRY-CHEMICAL EXTINGUISHING AGENT. A powder composed of small particles, usually of sodium bicarbonate, potassium bicarbonate, urea-potassium-based bicarbonate, potassium chloride or monoammonium phosphate, with added particulate material supplemented by special treatment to provide resistance to packing, resistance to moisture absorption (caking) and the proper flow capabilities.

DUST COLLECTION SYSTEM. A combination of equipment designed to contain, capture and collect airborne combustible dusts.

DUTCH DOOR. A door divided horizontally so that the top can be operated independently from the bottom.

[A] DWELLING. A building that contains one or two dwelling units used, intended or designed to be used, rented, leased, let or hired out to be occupied for living purposes.

[A] DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER. A sprinkler listed for early suppression fast-response performance.

[BE] EGRESS COURT. A court or yard which provides access to a public way for one or more exits.

ELECTROCHEMICAL DOUBLE LAYER CAPACITORS (EDLCS). *These devices are usually built up from an electrolyte, a separator, and two carbon-based electrodes. Also referred to as supercapacitors, they store energy using either ion adsorption (electrochemical double layer capacitors) or fast surface redox reactions (pseudo-capacitors). They are commonly also called "supercapacitors" or the trademarked "ultracapacitor™" because they store orders of magnitude more power and energy for the same unit mass or volume as a traditional electrolytic capacitor. They can release power and accept charge much faster than batteries for the same footprint, but store much less energy.*

ELECTROSTATIC FLUIDIZED BED. A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material that is electrically charged with a charge opposite to that of the object to be coated. Such object is transported through the container immediately above the charged and aerated materials in order to be coated.

ELEVATOR GROUP. A grouping of elevators in a building located adjacent or directly across from one another that respond to a common hall call button(s).

EMERGENCY ALARM SYSTEM. A system to provide indication and warning of emergency situations involving hazardous materials.

EMERGENCY CONTROL STATION. An approved location on the premises where signals from emergency equipment are received and which is staffed by trained personnel.

[BE] EMERGENCY ESCAPE AND RESCUE OPENING. An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency.

EMERGENCY EVACUATION DRILL. An exercise performed to train staff and occupants and to evaluate their efficiency and effectiveness in carrying out emergency evacuation procedures.

EMERGENCY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required life safety, fire alarm, detection and ventilation systems in the event of a failure of the primary power. Emergency power systems are required for electrical loads where interruption of the primary power could result in loss of human life or serious injuries.

EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM (ERCES). An infrastructure solution installed within a building to enhance the communications capabilities for first responders that utilizes solutions such as a signal booster, voting receiver, base station or other technology capable of enhancing the radio frequency (RF) to ensure effective public safety communications.

EMERGENCY SHUTOFF VALVE. A valve designed to shut off the flow of gases or liquids.

EMERGENCY SHUTOFF VALVE, AUTOMATIC. A fail-safe automatic-closing valve designed to shut off the flow of gases or liquids initiated by a control system that is activated by automatic means.

EMERGENCY SHUTOFF VALVE, MANUAL. A manually operated valve designed to shut off the flow of gases or liquids.

EMERGENCY VOICE/ALARM COMMUNICATIONS. Dedicated manual or automatic facilities for originating and distributing voice instructions, as well as alert and evacuation signals pertaining to a fire emergency, to the occupants of a building.

[BE] EMPLOYEE WORK AREA. All or any portion of a space used only by employees and only for work. Corridors, toilet rooms, kitchenettes and break rooms are not employee work areas.

ENERGY STORAGE MANAGEMENT SYSTEM. An electronic system that protects energy storage systems from operating outside their safe operating parameters and disconnects electrical power to the ESS or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

ENERGY STORAGE SYSTEM (ESS). One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time.

ENERGY STORAGE SYSTEM, ELECTROCHEMICAL. An energy storage system that stores energy and produces electricity using chemical reactions. It includes, among others, battery ESS and capacitor ESS.

ENERGY STORAGE SYSTEM, MOBILE. An energy storage system capable of being moved and utilized for temporary energy storage applications, and not installed as fixed or stationary electrical equipment. The system can include integral wheels for transportation or be loaded on a trailer and unloaded for charging, storage and deployment.

ENERGY STORAGE SYSTEM, STATIONARY. An energy storage system installed as fixed or stationary electrical equipment in a permanent location.

ENERGY STORAGE SYSTEM, WALK-IN UNIT. A prefabricated building that contains energy storage systems. It includes doors that provide walk-in access for personnel to maintain, test and service the equipment, and is typically used in outdoor and mobile ESS applications.

ENERGY STORAGE SYSTEM CABINET. An enclosure containing an energy storage system and meeting the applicable requirements of the listing for the system. Personnel are not able to enter the enclosure other than reaching in to access components for maintenance purposes.

ENERGY STORAGE SYSTEM COMMISSIONING. A systematic process that provides documented confirmation that an energy storage system functions according to the intended design criteria and complies with applicable code requirements.

ENERGY STORAGE SYSTEM DECOMMISSIONING. A systematic process that provides documentation and procedures that allow an energy storage system to be safely de-energized, disassembled, readied for shipment or storage, and removed from the premises in accordance with applicable code requirements.

[BG] EQUIPMENT PLATFORM. An unoccupied, elevated platform used exclusively for mechanical systems or industrial process equipment, including the associated elevated walkways, stairways, alternating tread devices and ladders necessary to access the platform (see Section 505.3 of the *California Building Code*).

EXCESS FLOW CONTROL. A fail-safe system or other approved means designed to shut off flow caused by a rupture in pressurized piping systems.

EXCESS FLOW VALVE. A valve inserted into a compressed gas cylinder, portable tank or stationary tank that is designed to positively shut off the flow of gas in the event that its predetermined flow is exceeded.

EXHAUSTED ENCLOSURE. An appliance or piece of equipment which consists of a top, a back and two sides providing a means of local exhaust for capturing gases, fumes, vapors and mists. Such enclosures include laboratory hoods, exhaust fume hoods and similar appliances and equipment used to retain and exhaust locally the gases, fumes, vapors and mists that could be released. Rooms or areas provided with general ventilation, in themselves, are not exhausted enclosures.

EXISTING. Buildings, facilities or conditions that are already in existence, constructed or officially authorized prior to the adoption of this code.

[BE] EXIT. That portion of a means of egress system between the exit access and the exit discharge or public way. Exit components include exterior exit doors at the level of exit discharge, interior exit stairways and ramps, exit passageways, exterior exit stairways and ramps and horizontal exits.

[BE] EXIT ACCESS. That portion of a means of egress system that leads from any occupied portion of a building or structure to an exit.

[BE] EXIT ACCESS DOORWAY. A door or access point along the path of egress travel from an occupied room, area or space where the path of egress enters an intervening room, corridor, exit access stairway or ramp.

[BE] EXIT ACCESS RAMP. A ramp within the exit access portion of the means of egress system.

[BE] EXIT ACCESS STAIRWAY. A stairway within the exit access portion of the means of egress system.

[BE] EXIT DISCHARGE. That portion of a means of egress system between the termination of an exit and a public way.

[BE] EXIT DISCHARGE, LEVEL OF. The story at the point at which an exit terminates and an exit discharge begins.

[BE] EXIT PASSAGEWAY. An exit component that is separated from other interior spaces of a building or structure by fire-resistance-rated construction and opening protectives, and provides for a protected path of egress travel in a horizontal direction to the exit discharge.

EXPANDED PLASTIC. A foam or cellular plastic material having a reduced density based on the presence of numerous small cavities or cells dispersed throughout the material.

EXPLOSION. An effect produced by the sudden violent expansion of gases, which may be accompanied by a shock wave or disruption, or both, of enclosing materials or structures. An explosion could result from any of the following:

1. Chemical changes such as rapid oxidation, deflagration or detonation, decomposition of molecules and runaway polymerization (usually detonations).
2. Physical changes such as pressure tank ruptures.
3. Atomic changes (nuclear fission or fusion).

EXPLOSIVE. A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.

The term "explosive" includes any material determined to be within the scope of USC Title 18: Chapter 40 and also includes any material classified as an explosive by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.

High explosive. Explosive material, such as dynamite, which can be caused to detonate by means of a No. 8 test blasting cap where unconfined.

Low explosive. Explosive material that will burn or deflagrate when ignited. It is characterized by a rate of reaction that is less than the speed of sound. Examples of low explosives include, but are not limited to, black powder, safety fuse, igniters, igniter cord, fuse lighters, fireworks and propellants, 1.3C.

Mass-detonating explosives. Division 1.1, 1.2 and 1.5 explosives alone or in combination, or loaded into various types of ammunition or containers, most of which can be expected to explode virtually instantaneously when a small portion is subjected to fire, severe concussion, impact, the impulse of an initiating agent or the effect of a considerable discharge of energy from without. Materials that react in this manner represent a mass explosion hazard. Such an explosive will normally cause severe structural damage to adjacent objects. Explosive propagation could occur immediately to other items of ammunition and explosives stored sufficiently close to and not adequately protected from the initially exploding pile with a time interval short enough so that two or more quantities must be considered as one for quantity-distance purposes.

UN/DOTn Class 1 explosives. The former classification system used by DOTn included the terms "high" and "low" explosives as defined herein. The following terms further define explosives under the current system applied by DOTn for all explosive materials defined as hazard Class 1 materials. Compatibility group letters are used in concert with the division to specify further limitations on each division noted (for example, the letter G identifies the material as a pyrotechnic substance or article containing a pyrotechnic substance and similar materials).

Division 1.1. Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.

Division 1.2. Explosives that have a projection hazard but not a mass explosion hazard.

Division 1.3. Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

Division 1.4. Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Division 1.5. Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Division 1.6. Extremely insensitive articles which do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

EXPLOSIVE MATERIAL. The term "*explosive*" material means explosives, blasting agents and detonators.

[BE] EXTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to yards, courts or public ways.

[BE] EXTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and is open to yards, courts or public ways.

[BF] EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

EXTRA-HIGH-RACK COMBUSTIBLE STORAGE. Storage on racks of Class I, II, III or IV commodities that exceed 40 feet (12 192 mm) in height and storage on racks of high-hazard commodities that exceed 30 feet (9144 mm) in height.

FABRICATION AREA. An area within a semiconductor fabrication facility and related research and development areas in which there are processes using hazardous production materials. Such areas are allowed to include ancillary rooms or areas such as dressing rooms and offices that are directly related to the fabrication area processes.

[A] FACILITY. A building or use in a fixed location including exterior storage areas for flammable and combustible substances and hazardous materials, piers, wharves, tank farms and similar uses. This term includes recreational vehicles, mobile home and manufactured housing parks, sales and storage lots.

FAIL-SAFE. A design condition incorporating a feature for automatically counteracting the effect of an anticipated possible source of failure; also, a design condition eliminating or mitigating a hazardous condition by compensating automatically for a failure or malfunction.

FALSE ALARM. The willful and knowing initiation or transmission of a signal, message or other notification of an event of fire when no such danger exists.

FINES. Small pieces or splinters of wood byproducts that will pass through a 0.25-inch (6.4 mm) screen.

FIRE ALARM. The giving, signaling or transmission to any public fire station, or company or to any officer or employee thereof, whether by telephone, spoken word or otherwise, of information to the effect that there is a fire at or near the place indicated by the person giving, signaling or transmitting such information.

FIRE ALARM BOX, MANUAL. See "Manual fire alarm box."

FIRE ALARM CONTROL UNIT. A system component that receives inputs from automatic and manual fire alarm devices and may be capable of supplying power to detection devices and transponder(s) or off-premises transmitter(s). The control unit may be capable of providing a transfer of power to the notification appliances and transfer of condition to relays or devices.

FIRE ALARM SIGNAL. A signal initiated by a fire alarm-initiating device such as a manual fire alarm box, automatic fire detector, waterflow switch or other device whose activation is indicative of the presence of a fire or fire signature.

FIRE ALARM SYSTEM. A system or portion of a combination system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

FIRE APPARATUS ACCESS ROAD. A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as fire lane, public street, private street, parking lot lane and access roadway.

FIRE APPLIANCE. *See Section 902.1.*

[BF] FIRE AREA. The aggregate floor area enclosed and bounded by fire walls, fire barriers, exterior walls or horizontal assemblies of a building. Areas of the building not provided with surrounding walls shall be included in the fire area if such areas are included within the horizontal projection of the roof or floor next above.

[BF] FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

FIRE CHIEF. The chief officer of the fire department serving the jurisdiction, or a duly authorized representative.

FIRE CODE OFFICIAL. The fire chief or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative.

FIRE COMMAND CENTER. The principal attended or unattended location where the status of detection, alarm communications and control systems is displayed, and from which the system(s) can be manually controlled.

[BF] FIRE DAMPER. A listed device installed in ducts and air transfer openings designed to close automatically upon detection of heat and resist the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in dynamic systems that continue to operate during a fire. A dynamic fire damper is tested and rated for closure under elevated temperature airflow.

FIRE DEPARTMENT MASTER KEY. A limited issue key of special or controlled design to be carried by fire department officials in command which will open key boxes on specified properties.

FIRE DETECTOR, AUTOMATIC. A device designed to detect the presence of a fire signature and to initiate action.

[BF] FIRE DOOR. The door component of a fire door assembly.

[BF] FIRE DOOR ASSEMBLY. Any combination of a fire door, frame, hardware and other accessories that together provide a specific degree of fire protection to the opening.

[BF] FIRE EXIT HARDWARE. Panic hardware that is listed for use on fire door assemblies.

FIRE LANE. A road or other passageway developed to allow the passage of fire apparatus. A fire lane is not necessarily intended for vehicular traffic other than fire apparatus.

[BF] FIRE PARTITION. A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

FIRE POINT. The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame in accordance with ASTM D92.

[BF] FIRE PROTECTION RATING. The period of time that an opening protective assembly will maintain the ability to confine a fire as determined by tests prescribed in Section 716 of the *California Building Code*. Ratings are stated in hours or minutes.

FIRE PROTECTION SYSTEM. Approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

[BF] FIRE RESISTANCE. That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

FIRE SAFETY FUNCTIONS. Building and fire control functions that are intended to increase the level of life safety for occupants or to control the spread of the harmful effects of fire.

[BF] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. The closest interior lot line.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two buildings on the lot.

The distance shall be measured at right angles from the face of the wall.

[BF] FIRE WALL. A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

FIRE WATCH. A temporary measure intended to ensure continuous and systematic surveillance of a building or portion thereof by one or more qualified individuals for the purposes of identifying and controlling fire hazards, detecting early signs of unwanted fire, raising an alarm of fire and notifying the fire department.

[BF] FIREBLOCKING. Building materials, or materials approved for use as fireblocking, installed to resist the free passage of flame to other areas of the building through concealed spaces.

[BF] FIRE-RESISTANCE RATING. The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703 of the *California Building Code*.

[BF] FIRE-RESISTANT JOINT SYSTEM. An assemblage of specific materials or products that are designed, tested and fire-resistance rated in accordance with either ASTM E1966 or UL 2079 to resist for a prescribed period of time the passage of fire through joints made in or between fire-resistance-rated assemblies.

FIREWORKS. Any composition or device for the purpose of producing a visible or an audible effect for entertainment purposes by combustion, deflagration or detonation that meets the definition of 1.3G fireworks or 1.4G fireworks.

Fireworks, 1.3G. Large fireworks devices, which are explosive materials, intended for use in fireworks displays and designed to produce audible or visible effects by combustion, deflagration or detonation. Such 1.3G fireworks include, but are not limited to, firecrackers containing more than 130 milligrams (2 grains) of explosive composition, aerial shells containing more than 40 grams of pyrotechnic composition and other display pieces which exceed the limits for classification as 1.4G fireworks. Such 1.3G fireworks are also described as Fireworks, UN 0335 by the DOTn.

Fireworks, 1.4G. Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visible or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for Fireworks, UN 0336, and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.

Note: *Fireworks shall have the same meaning as defined in Health and Safety Code Sections 12511 and 12512 which have been reprinted as follows:*

12511. "Fireworks" means any device containing chemical elements and chemical compounds capable of burning independently of the oxygen of the atmosphere and producing audible, visual, mechanical or thermal effects which are useful as pyrotechnic devices or for entertainment.

The term "fireworks" includes, but is not limited to, devices designated by the manufacturer as fireworks, torpedoes, skyrockets, roman candles, rockets, Daygo bombs, sparklers, party poppers, paper caps, chasers, fountains, smoke sparks, aerial bombs and fireworks kits.

12512. "Fireworks kit" means any assembly of materials or explosive substances, which is designed and intended by the seller to be assembled by the person receiving such material or explosive substance and when so assembled would come within the definition of fireworks in Section 12511.

FIREWORKS DISPLAY. A presentation of fireworks for a public or private gathering.

[BG] FIXED BASE OPERATOR (FBO). A commercial business granted the right by the airport sponsor to operate on an airport and provide aeronautical services such as fueling, hangaring, tie-down and parking, aircraft rental, aircraft maintenance and flight instruction.

FIXED GUIDEWAY AND PASSENGER RAIL TRANSIT SYSTEMS. *(See California Building Code, Section 443.)*

[BE] FIXED SEATING. Furniture or fixtures designed and installed for the use of sitting and secured in place including bench-type seats and seats with or without back or arm rests.

[BF] FLAME SPREAD. The propagation of flame over a surface.

[BF] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.

FLAMMABLE CRYOGENIC FLUID. A cryogenic fluid that is flammable in its vapor state.

FLAMMABLE FINISHES. Coatings to articles or materials in which the material being applied is a flammable liquid, combustible liquid, combustible powder, fiberglass resin or flammable or combustible gel coating.

FLAMMABLE GAS. A material that is a gas at 68°F (20°C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] subdivided as follows:

1. Category 1A. A gas that meets either of the following:
   1.1. Ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air.
   1.2. A flammable range at 14.7 psia (101 kPa) with air of not less than 12 percent, regardless of the lower limit, unless data shows compliance with Category 1B.
2. Category 1B. A gas that meets the flammability criteria for Category 1A, is not pyrophoric or chemically unstable, and meets one of more of the following:
   2.1. A lower flammability limit of more than 6 percent by volume of air.
   2.2. A fundamental burning velocity of less than 3.9 inches/second (99 mm/s).

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.

Where not otherwise specified, the term “flammable gas” includes both Categories 1A and 1B.

FLAMMABLE LIQUEFIED GAS. A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68°F (20°C) and which is flammable.

FLAMMABLE LIQUID. A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

The category of flammable liquids does not include compressed gases or cryogenic fluids or liquids that do not have a fire point when tested in accordance with ASTM D92.

Class IA. Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).

Class IB. Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).

Class IC. Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).

FLAMMABLE MATERIAL. A material capable of being readily ignited from common sources of heat or at a temperature of 600°F (316°C) or less.

FLAMMABLE SOLID. A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.

FLAMMABLE VAPOR AREA. An area in which the concentration of flammable constituents (vapor, gas, fume, mist or dust) in air exceeds 25 percent of their lower flammable limit (LFL) because of the flammable finish processes operation. It shall include:

1. The interior of spray booths.
2. The interior of ducts exhausting from spraying processes.
3. Any area in the direct path of spray or any area containing dangerous quantities of air-suspended powder, combustible residue, dust, deposits, vapor or mists as a result of spraying operations.
4. The area in the vicinity of dip tanks, drain boards or associated drying, conveying or other equipment during operation or shutdown periods.

The fire code official is authorized to determine the extent of the flammable vapor area, taking into consideration the material characteristics of the flammable materials, the degree of sustained ventilation and the nature of the operations.

FLAMMABLE VAPORS OR FUMES. The concentration of flammable constituents in air that exceeds 25 percent of their lower flammable limit (LFL).

FLASH POINT. The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D56, ASTM D93 or ASTM D3278.

FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY. That portion of a commercial, industrial, governmental or manufacturing property where liquids used as fuels are stored and dispensed into the fuel tanks of motor vehicles that are used in connection with such businesses, by persons within the employ of such businesses.

[BE] FLIGHT. A continuous run of rectangular treads, winders or combination thereof from one landing to another.

FLOAT. A floating structure normally used as a point of transfer for passengers and goods, or both, for mooring purposes.

[BE] FLOOR AREA, GROSS. The floor area within the inside perimeter of the exterior walls of the building under consideration, exclusive of vent shafts and courts, without deduction for corridors, stairways, ramps, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts.

[BE] FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as corridors, stairways, ramps, toilet rooms, mechanical rooms and closets.

FLUE SPACES.

Longitudinal flue space. The flue space between rows of storage perpendicular to the direction of loading.

Transverse flue space. The space between rows of storage parallel to the direction of loading.

FLUIDIZED BED. A container holding powder coating material that is aerated from below so as to form an air-supported expanded cloud of such material through which the preheated object to be coated is immersed and transported.

FOAM-EXTINGUISHING SYSTEM. A special system discharging a foam made from concentrates, either mechanically or chemically, over the area to be protected.

[BE] FOLDING AND TELESCOPIC SEATING. Tiered seating having an overall shape and size that is capable of being reduced for purposes of moving or storing and is not a building element.

[BG] FOSTER CARE FACILITIES. Facilities that provide care to more than five children, $2^1/_2$ years of age or less.

FREQUENCY. The particular waveband at which a communications system broadcasts or transmits.

FREQUENCY LICENSE HOLDER(S). The person(s) or entity(s) that is issued the license from the frequency licensing authority of the United States or other country of jurisdiction for the frequencies being used by both the in-building emergency responder communications enhancement system and the emergency services communications system that it enhances.

FREQUENCY LICENSING AUTHORITY. The government authority in a country or territory that issues frequency licenses for the use of communications frequencies by authorized entities and individuals.

FUEL CELL POWER SYSTEM, STATIONARY. A stationary energy generation system that converts the chemical energy of a fuel and oxidant to electric energy (DC or AC electricity) by an electrochemical process.

Field-fabricated fuel cell power system. A stationary fuel cell power system that is assembled at the job site and is not a preengineered or prepackaged factory-assembled fuel cell power system.

Preengineered fuel cell power system. A stationary fuel cell power system consisting of components and modules that are produced in a factory, and shipped to the job site for assembly.

Prepackaged fuel cell power system. A stationary fuel cell power system that is factory assembled as a single, complete unit and shipped as a complete unit for installation at the job site.

FUEL LIMIT SWITCH. A mechanism, located on a tank vehicle, that limits the quantity of product dispensed at one time.

FULL-TIME CARE *shall mean the establishment and routine care of persons on an hourly, daily, weekly, monthly, yearly or permanent basis, whether for 24-hours per day or less, and where sleeping accommodations are provided.*

FUMIGANT. A substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor utilized for the destruction or control of insects, fungi, vermin, germs, rats or other pests, and shall be distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases. Examples are methyl bromide, ethylene dibromide, hydrogen cyanide, carbon disulfide and sulfuryl fluoride.

FUMIGATION. The utilization within an enclosed space of a fumigant in concentrations that are hazardous or acutely toxic to humans.

FURNACE CLASS A. An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there is a potential explosion or fire hazard that could be occasioned by the presence of flammable volatiles or combustible materials processed or heated in the furnace.

Note: Such flammable volatiles or combustible materials can, for instance, originate from the following:

1. Paints, powders, inks, and adhesives from finishing processes, such as dipped, coated, sprayed and impregnated materials.
2. The substrate material.
3. Wood, paper and plastic pallets, spacers or packaging materials.
4. Polymerization or other molecular rearrangements.

Potentially flammable materials, such as quench oil, waterborne finishes, cooling oil or cooking oils, that present a hazard are ventilated according to Class A standards.

FURNACE CLASS B. An oven or furnace that has heat utilization equipment operating at approximately atmospheric pressure wherein there are no flammable volatiles or combustible materials being heated.

FURNACE CLASS C. An oven or furnace that has a potential hazard due to a flammable or other special atmosphere being used for treatment of material in process. This type of furnace can use any type of heating system and includes a special atmosphere supply system. Also included in the Class C classification are integral quench furnaces and molten salt bath furnaces.

FURNACE CLASS D. An oven or furnace that operates at temperatures from above ambient to over 5,000°F (2760°C) and at pressures normally below atmospheric using any type of heating system. These furnaces can include the use of special processing atmospheres.

GAS CABINET. A fully enclosed, ventilated, noncombustible enclosure used to provide an isolated environment for compressed gas cylinders in storage or use. Doors and access ports for exchanging cylinders and accessing pressure-regulating controls are allowed to be included.

GAS DETECTION SYSTEM. A system or portion of a combination system that utilizes one or more stationary sensors to detect the presence of a specified gas at a specified concentration and initiate one or more responses required by this code, such as notifying a responsible person, activating an alarm signal, or activating or deactivating equipment. A self-contained gas detection and alarm device is not classified as a gas detection system.

GAS ROOM. A separately ventilated, fully enclosed room in which only compressed gases and associated equipment and supplies are stored or used.

GAS ROOM, HYDROGEN FUEL. See "Hydrogen fuel gas room."

GASEOUS HYDROGEN SYSTEM. An assembly of piping, devices and apparatus designed to generate, store, contain, distribute or transport a nontoxic, gaseous hydrogen-containing mixture having not less than 95-percent hydrogen gas by volume and not more than 1-percent oxygen by volume. Gaseous hydrogen systems consist of items such as compressed gas containers, reactors and appurtenances, including pressure regulators, pressure relief devices, manifolds, pumps, compressors and interconnecting piping and tubing and controls.

GLOVE BOX. A sealed enclosure in which items inside the box are handled exclusively using long gloves sealed to ports in the enclosure.

[BE] GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENING. An emergency escape and rescue opening located such that the bottom of the clear opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.

[BG] GRADE PLANE. A reference plane representing the average of finished ground level adjoining the building at exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6 feet (1829 mm) from the building, between the building and a point 6 feet (1829 mm) from the building.

[BE] GRANDSTAND. Tiered seating supported on a dedicated structural system and two or more rows high and is not a building element (see "Bleachers").

[BG] GROUP HOME. *Group Home means a facility which provides 24-hour care and supervision to children, provides services specified in this chapter to a specific client group, and maintains a structured environment, with such services provided at least in part by staff employed by the licensee. The care and supervision provided by a group home shall be nonmedical except as permitted by Welfare and Institutions Code Section 17736(b). Since small family and foster family homes, by definition, care for six or fewer children only, any facility providing 24-hour care for seven or more children must be licensed as a group home.*

[BE] GUARD. A building component or a system of building components located at or near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to a lower level.

[BG] GUESTROOM. A room used or intended to be used by one or more guests for living or sleeping purposes.

[BS] GYPSUM BOARD. A type of gypsum panel product consisting of a noncombustible core primarily of gypsum with paper surfacing.

[BS] GYPSUM WALLBOARD. A gypsum board used primarily as an interior surfacing for building structures.

[BG] HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

HALOGENATED EXTINGUISHING SYSTEM. A fire-extinguishing system using one or more atoms of an element from the halogen chemical series: fluorine, chlorine, bromine and iodine.

HANDLING. The deliberate transport by any means to a point of storage or use.

[BE] HANDRAIL. A horizontal or sloping rail intended for grasping by the hand for guidance or support.

HAZARDOUS MATERIALS. Those chemicals or substances which are physical hazards or health hazards as defined and classified in this chapter, whether the materials are in usable or waste condition.

HAZARDOUS PRODUCTION MATERIAL (HPM). A solid, liquid or gas associated with semiconductor manufacturing that has a degree-of-hazard rating in health, flammability or instability of Class 3 or 4 as ranked by NFPA 704 and which is used directly in research, laboratory or production processes which have, as their end product, materials that are not hazardous.

HEALTH HAZARD. A classification of a chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term "health hazard" includes chemicals that are toxic, highly toxic and corrosive.

HEAT DETECTOR. See "Detector, heat."

[BG] HEIGHT, BUILDING. The vertical distance from grade plane to the average height of the highest roof surface.

HELIPORT. An area of land or water or a structural surface that is used, or intended for use, for the landing and taking off of helicopters, and any appurtenant areas which are used, or intended for use, for heliport buildings and other heliport facilities.

HELISTOP. The same as "Heliport," except that fueling, defueling, maintenance, repairs or storage of helicopters is not permitted.

HI-BOY. A cart used to transport hot roofing materials on a roof.

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HIGHLY TOXIC. A material which produces a lethal dose or lethal concentration which falls within any of the following categories:

1. A chemical that has a median lethal dose (LD_{50}) of 50 milligrams or less per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD_{50}) of 200 milligrams or less per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC_{50}) in air of 200 parts per million by volume or less of gas or vapor, or 2 milligrams per liter or less of mist, fume or dust, when administered by continuous inhalation for one hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

Mixtures of these materials with ordinary materials, such as water, might not warrant classification as highly toxic. While this system is basically simple in application, any hazard evaluation that is required for the precise categorization of this type of material shall be performed by experienced, technically competent persons.

HIGHLY VOLATILE LIQUID. A liquefied compressed gas with a boiling point of less than 68°F (20°C).

HIGH-PILED COMBUSTIBLE STORAGE. Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet (3658 mm) in height. Where required by the fire code official, high-piled combustible storage also includes certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities, where the top of storage is greater than 6 feet (1829 mm) in height.

HIGH-PILED STORAGE AREA. An area within a building which is designated, intended, proposed or actually used for high-piled combustible storage, including operating aisles.

[BG] HIGH-RISE BUILDING. *In other than Group I-2 occupancies, "high-rise buildings" as used in this code:*

Existing high-rise structure. *A high-rise structure, the construction of which is commenced or completed prior to July 1, 1974.*

High-rise structure. *Every building of any type of construction or occupancy having floors used for human occupancy located more than 75 feet above the lowest floor level having building access (see Section 403), except buildings used as hospitals as defined in Health and Safety Code Section 1250.*

New high-rise building. *A high-rise structure, the construction of which is commenced on or after July 1, 1974. For the purpose of this section, construction shall be deemed to have commenced when plans and specifications are more than 50 percent complete and have been presented to the local jurisdiction prior to July 1, 1974. Unless all provisions of this section have been met, the construction of such buildings shall commence on or before January 1, 1976.*

New high-rise structure. *A high-rise structure, the construction of which is commenced on or after July 1, 1974.*

HIGH-VOLTAGE TRANSMISSION LINE. An electrical power transmission line operating at or above 66 kilovolts.

HIGHWAY. *Any* public street, public alley or public road *including a privately financed, constructed or maintained road that is regularly and openly traveled by the general public (27 CFR).*

[A] HISTORIC BUILDINGS. Any building or structure that is one or more of the following:

1. Listed, or certified as eligible for listing by the state historic preservation officer or the Keeper of the National Register of Historic Places, in the National Register of Historic Places.
2. Designated as historic under an applicable state or local law.
3. Certified as a contributing resource within a national register, state designated or locally designated historic district.

HOGGED MATERIALS. Wood waste materials produced from the lumber production process.

HOLDING FACILITY. *A detention or correctional facility or area where inmates, staff and public are not housed but are restrained.*

[M] HOOD. An air-intake device used to capture by entrapment, impingement, adhesion or similar means, grease and similar contaminants before they enter a duct system.

Type I. A kitchen hood for collecting and removing grease vapors and smoke.

Type II. A general kitchen hood for collecting and removing steam vapor, heat, odors and products of combustion.

[BF] HORIZONTAL ASSEMBLY. A fire-resistance-rated floor or roof assembly of materials designed to restrict the spread of fire in which continuity is maintained.

[BE] HORIZONTAL EXIT. An exit component consisting of fire-resistance-rated construction and opening protectives intended to compartmentalize portions of a building thereby creating refuge areas that afford safety from fire and smoke from the area of fire origin.

[BG] HOSPITALS AND PSYCHIATRIC HOSPITALS. Facilities that provide care or treatment for the medical, psychiatric, obstetrical, or surgical treatment of inpatient care recipients that are incapable of self-preservation *or classified as nonambulatory or bedridden.*

HOT WORK. Operations including cutting, welding, Thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof systems or any other similar activity.

HOT WORK AREA. The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

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HOT WORK EQUIPMENT. Electric or gas welding or cutting equipment used for hot work.

HOT WORK PERMITS. Permits issued by the responsible person at the facility under the hot work permit program permitting welding or other hot work to be done in locations referred to in Section 3503.3 and prepermitted by the fire code official.

HOT WORK PROGRAM. A permitted program, carried out by approved facilities-designated personnel, allowing them to oversee and issue permits for hot work conducted by their personnel or at their facility. The intent is to have trained, on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

HOUSING UNIT *is an area intended to lodge inmates on a 24-hour basis where accommodations are provided for sleeping.*

HPM. See "Hazardous production material."

HPM FACILITY. See "Semiconductor fabrication facility."

HPM ROOM. A room used in conjunction with or serving a Group H-5 occupancy, where HPM is stored or used and which is classified as a Group H-2, H-3 or H-4 occupancy.

HYBRID FIRE-EXTINGUISHING SYSTEM. A system that utilizes a combination of atomized water and inert gas to extinguish fire.

HYDROGEN FUEL GAS ROOM. A room or space that is intended exclusively to house a gaseous hydrogen system.

HYDROGEN-FUELED VEHICLES. *Hydrogen-fueled vehicles are motor vehicles having compressed hydrogen fuel storage tanks on board and using hydrogen fuel directly or indirectly for the motor vehicle propulsion. Hydrogen-fueled vehicles include fuel cell electric vehicles, battery electric vehicles with fuel cell range extender and internal combustion engine vehicles.*

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH). The concentration of airborne contaminants that poses a threat of death, immediate or delayed permanent adverse health effects, or effects that could prevent escape from such an environment. This contaminant concentration level is established by the National Institute of Occupational Safety and Health (NIOSH) based on both toxicity and flammability. It generally is expressed in parts per million by volume (ppm v/v) or milligrams per cubic meter (mg/m^3). Where adequate data do not exist for precise establishment of IDLH concentrations, an independent certified industrial hygienist, industrial toxicologist, appropriate regulatory agency or other source approved by the fire code official shall make such determination.

IMPAIRMENT COORDINATOR. The person responsible for the maintenance of a particular fire protection system.

[BG] INCAPABLE OF SELF-PRESERVATION. Persons who, because of age, physical limitations, mental limitations, chemical dependency or medical treatment, cannot respond as an individual to an emergency situation.

INCOMPATIBLE MATERIALS. Materials that, when mixed, have the potential to react in a manner which generates heat, fumes, gases or byproducts which are hazardous to life or property.

INERT GAS. A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.

INFANT. *For the purpose of these regulations, shall mean any child who because of age only, is unable to walk and requires the aid of another person to evacuate the building. In no case shall the term "infant" mean a child 2 years of age or older.*

INFLATABLE AMUSEMENT DEVICE. A device made of flexible fabric or other combustible materials that is inflated by one or more air blowers providing internal air pressure to maintain its shape. Such devices are typically designed for recreational activities that allow occupants to bounce, climb, slide, negotiate an obstacle course or participate in interactive play.

INFORMATION TECHNOLOGY EQUIPMENT (ITE). Computers, data storage, servers and network communication equipment.

INFORMATION TECHNOLOGY EQUIPMENT FACILITIES (ITEF). Data centers and computer rooms used primarily to house information technology equipment.

INHABITED BUILDING. A building regularly occupied in whole or in part as a habitation for people, or any place of religious worship, schoolhouse, railroad station, store or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosive materials.

INITIATING DEVICE. A system component that originates transmission of a change-of-state condition, such as in a smoke detector, manual fire alarm box, or supervisory switch.

INSECTICIDAL FOGGING. The utilization of insecticidal liquids passed through fog-generating units where, by means of pressure and turbulence, with or without the application of heat, such liquids are transformed and discharged in the form of fog or mist blown into an area to be treated.

INTEGRATED TESTING (FIRE PROTECTION AND LIFE SAFETY SYSTEM). A testing procedure to establish the operational status, interaction and coordination of two or more fire protection and safety systems.

[BE] INTERIOR EXIT RAMP. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

[BE] INTERIOR EXIT STAIRWAY. An exit component that serves to meet one or more means of egress design requirements, such as required number of exits or exit access travel distance, and provides for a protected path of egress travel to the exit discharge or public way.

[BG] INTERIOR FINISH. Interior finish includes interior wall and ceiling finish and interior floor finish.

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[BG] INTERIOR FLOOR-WALL BASE. Interior floor finish trim used to provide a functional or decorative border at the intersection of walls and floors.

[BG] INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings, including but not limited to: fixed or movable walls and partitions; toilet room privacy partitions; columns; ceilings; and interior wainscoting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including trim.

IRRITANT. A chemical which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of CPSC 16 CFR Part 1500.41 for an exposure of four or more hours or by other appropriate techniques, it results in an empirical score of 5 or more. A chemical is classified as an eye irritant if so determined under the procedure listed in CPSC 16 CFR Part 1500.42 or other approved techniques.

[A] JURISDICTION. The governmental unit that has adopted this code.

KEY BOX. A secure device with a lock operable only by a fire department master key, and containing building entry keys and other keys that may be required for access in an emergency.

[A] LABELED. Equipment, materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of such labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

LABORATORY. [SFM] *A room, building or area where the use and storage of hazardous materials are utilized for testing, analysis, instruction, research or developmental activities.*

LABORATORY SUITE. [SFM] *A laboratory suite is a Group L occupancy space within a building or structure, which may include multiple laboratories, offices, storage, equipment rooms or similar support functions, where the aggregate quantities of hazardous materials stored and used do not exceed the quantities set forth in the California Building Code Table 453.7.3.1 (see the California Building Code Section 453).*

➡ **LANDSCAPED ROOF.** An area over a roof assembly incorporating planters, vegetation, hardscaping or other similar decorative appurtenances that are not part of the roof assembly.

LEVEL OF EXIT DISCHARGE. See "Exit discharge, level of."

LIFE SAFETY SYSTEMS. Systems, devices and equipment that enhance or facilitate evacuation, smoke control, compartmentation and/or isolation.

LIMITED SPRAYING SPACE. An area in which operations for touch-up or spot painting of a surface area of 9 square feet (0.84 m^2) or less are conducted.

LIQUEFIED NATURAL GAS (LNG). A fluid in the liquid state composed predominantly of methane and which may contain minor quantities of ethane, propane, nitrogen or other components normally found in natural gas.

LIQUEFIED PETROLEUM GAS (LP-gas). A material which is composed predominantly of the following hydrocarbons or mixtures of them: propane, propylene, butane (normal butane or isobutane) and butylenes.

LIQUID. A material having a melting point that is equal to or less than 68°F (20°C) and a boiling point which is greater than 68°F (20°C) at 14.7 pounds per square inch absolute (psia) (101 kPa). Where not otherwise identified, the term "liquid" includes both flammable and combustible liquids.

LIQUID OXYGEN AMBULATORY CONTAINER. A container used for liquid oxygen not exceeding 0.396 gallons (1.5 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended for portable therapeutic use and to be filled from its companion base unit, a liquid oxygen home care container.

LIQUID OXYGEN HOME CARE CONTAINER. A container used for liquid oxygen not exceeding 15.8 gallons (60 liters) specifically designed for use as a medical device as defined by 21 USC Chapter 9 that is intended to deliver gaseous oxygen for therapeutic use in a home environment.

LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

LIQUID STORAGE WAREHOUSE. A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

[A] LISTED. Equipment, materials, products or services included in a list published by an organization acceptable to the fire code official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. Terms that are used to identify listed equipment, products or materials include "listed," "certified," "classified" or other terms as determined appropriate by the listing organization.

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For applications listed in Section 1.11 regulated by the Office of the State Fire Marshal, "listed" shall also mean equipment or materials accepted by the State Fire Marshal as conforming to the provisions of the State Fire Marshal's regulations and which are included in a list published by the State Fire Marshal.

LOCKDOWN. An emergency situation, in other than a Group I-3 occupancy, requiring that the occupants be sheltered and secured in place within a building when normal evacuation would put occupants at risk.

LODGING HOUSE *is any building or portion thereof containing not more than five guest rooms where rent is paid in money, goods, labor or otherwise.*

[BG] LODGING HOUSE. A one-family dwelling where one or more occupants are primarily permanent in nature and rent is paid for guestrooms.

LONGITUDINAL FLUE SPACE. See "Flue spaces—longitudinal."

[A] LOT. A portion or parcel of land considered as a unit.

[A] LOT LINE. A line dividing one lot from another, or from a street or any public place.

[BE] LOW-ENERGY POWER-OPERATED DOOR. Swinging, sliding or folding door which opens automatically upon an action by a pedestrian such as pressing a push plate or waving a hand in front of a sensor. The door closes automatically, and operates with decreased forces and decreased speeds. See also "Power-assisted door" and "Power-operated door."

LOWER EXPLOSIVE LIMIT (LEL). See "Lower flammable limit."

LOWER FLAMMABLE LIMIT (LFL). The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. The LFL is sometimes referred to as LEL or lower explosive limit.

LOW-PRESSURE TANK. A storage tank designed to withstand an internal pressure greater than 0.5 pound per square inch gauge (psig) (3.4 kPa) but not greater than 15 psig (103.4 kPa).

LP-GAS CONTAINER. Any vessel, including cylinders, tanks, portable tanks and cargo tanks, used for transporting or storing LP-gases.

MAGAZINE. A building, structure or container, other than an operating building, approved for storage of explosive materials.

Indoor. A portable structure, such as a box, bin or other container, constructed as required for Type 2, 4 or 5 magazines in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 so as to be fire resistant and theft resistant.

Type 1. A permanent structure, such as a building or igloo, that is bullet resistant, fire resistant, theft resistant, weather resistant and ventilated in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

Type 2. A portable or mobile structure, such as a box, skid-magazine, trailer or semitrailer, constructed in accordance with the requirements of NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 that is fire resistant, theft resistant, weather resistant and ventilated. If used outdoors, a Type 2 magazine is also bullet resistant.

Type 3. A fire resistant, theft resistant and weather resistant "day box" or portable structure constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555 used for the temporary storage of explosive materials.

Type 4. A permanent, portable or mobile structure such as a building, igloo, box, semitrailer or other mobile container that is fire resistant, theft resistant and weather resistant and constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

Type 5. A permanent, portable or mobile structure such as a building, igloo, box, bin, tank, semitrailer, bulk trailer, tank trailer, bulk truck, tank truck or other mobile container that is theft resistant, which is constructed in accordance with NFPA 495, NFPA 1124 or DOTy 27 CFR Part 555.

MAGNESIUM. The pure metal and alloys, of which the major part is magnesium.

MALL. See "Covered mall building."

[BE] MANUAL BOLT. Door locking hardware operable from one side of the door, or from the edge of a door leaf, with a bolt or rod extended and retracted by manual movement of the bolt or rod, such as a manual flush bolt or manual surface bolt (see "Automatic flush bolt," "Constant latching bolt," "Dead bolt").

MANUAL FIRE ALARM BOX. A manually operated device used to initiate an alarm signal.

MANUAL STOCKING METHODS. Stocking methods utilizing ladders or other nonmechanical equipment to move stock.

MARINA. Any portion of the ocean or inland water, either naturally or artificially protected, for the mooring, servicing or safety of vessels and shall include artificially protected works, the public or private lands ashore, and structures or facilities provided within the enclosed body of water and ashore for the mooring or servicing of vessels or the servicing of their crews or passengers.

MARINE MOTOR FUEL-DISPENSING FACILITY. That portion of property where flammable or combustible liquids or gases used as fuel for watercraft are stored and dispensed from fixed equipment on shore, piers, wharves, floats or barges into the fuel tanks of watercraft and shall include all other facilities used in connection therewith.

MASS TIMBER. *Structural elements of Type IV construction primarily of solid, built-up, panelized or engineered wood products that meet minimum cross section dimensions of Type IV construction.*

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA. The maximum amount of a hazardous material allowed to be stored or used within a control area inside a building or an outdoor control area. The maximum allowable quantity per control area is based on the material state (solid, liquid or gas) and the material storage or use conditions.

[BE] MEANS OF EGRESS. A continuous and unobstructed path of vertical and horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

MECHANICAL STOCKING METHODS. Stocking methods utilizing motorized vehicles or hydraulic jacks to move stock.

MECHANICAL-ACCESS ENCLOSED PARKING GARAGE. *An enclosed parking garage which employs parking machines, lifts, elevators or other mechanical devices for vehicle moving from and to street level and in which public occupancy in the garage is prohibited in all areas except the vehicle access bay.*

[BG] MEDICAL CARE. Care involving medical or surgical procedures, nursing or for psychiatric purposes.

MEMBRANE STRUCTURE. An air-inflated, air-supported, cable or frame-covered structure as defined by the *California Building Code* and not otherwise defined as a tent. See Chapter 31 of the *California Building Code*.

[BF] MEMBRANE-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor-ceiling, roof-ceiling or wall assembly, one or more penetrating items installed into or passing through the breach in one side of the assembly and the materials or devices, or both, installed to resist the spread of fire into the assembly for a prescribed period of time.

[BE] MERCHANDISE PAD. A merchandise pad is an area for display of merchandise surrounded by aisles, permanent fixtures or walls. Merchandise pads contain elements such as nonfixed and moveable fixtures, cases, racks, counters and partitions as indicated in Section 105.2 of the *California Building Code* from which customers browse or shop.

METAL HYDRIDE. A generic name for compounds composed of metallic element(s) and hydrogen.

METAL HYDRIDE STORAGE SYSTEM. A closed system consisting of a group of components assembled as a package to contain metal-hydrogen compounds for which there exists an equilibrium condition where the hydrogen-absorbing metal alloy(s), hydrogen gas and the metal-hydrogen compound(s) coexist and where only hydrogen gas is released from the system in normal use.

[BG] MEZZANINE. An intermediate level or levels between the floor and ceiling of any story and in accordance with Section 505 of the *California Building Code*.

MISCELLA. A mixture, in any proportion, of the extracted oil or fat and the extracting solvent.

➡ **MOBILE FUELING.** The operation of dispensing liquid *and gaseous* fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms "Mobile fleet fueling," *and for conventional liquid fuels as* "Wet fueling" and "Wet hosing."

MOBILE FUELING, HYDROGEN. The operation of dispensing gaseous hydrogen from tank vehicles or tank trailers into the fuel tanks of hydrogen-fueled motor vehicles. Hydrogen mobile fueling may also be known by the term "Hydrogen mobile fleet fueling."

MORTAR. *See Section 5608.*

MULTIPLE-STATION ALARM DEVICE. Two or more single-station alarm devices that can be interconnected such that actuation of one causes all integral or separate audible alarms to operate. A multiple-station alarm device can consist of one single-station alarm device having connections to other detectors or to a manual fire alarm box.

MULTIPLE-STATION SMOKE ALARM. Two or more single-station alarm devices that are capable of interconnection such that actuation of one causes the appropriate alarm signal to operate in all interconnected alarms.

NESTING. A method of securing flat-bottomed compressed gas cylinders upright in a tight mass using a contiguous three-point contact system whereby all cylinders within a group have not less than three points of contact with other cylinders, walls or bracing.

NET EXPLOSIVE WEIGHT (net weight). The weight of explosive material expressed in pounds. The net explosive weight is the aggregate amount of explosive material contained within buildings, magazines, structures or portions thereof, used to establish quantity-distance relationships.

NON-ACCESSIBLE AREA. *An enclosed area that creates a cavity by the application of any construction feature and/or building materials. This area shall be recognized by the enforcing agency as a separation between the non-accessible space and any adjacent, occupied space of the building.*

NONAMBULATORY PERSONS. *Persons unable to leave a building unassisted under emergency conditions. It includes, but is not limited to, persons who depend on mechanical aids such as crutches, walkers and wheelchairs and any person who is unable to physically and mentally respond to a sensory signal approved by the State Fire Marshal or an oral instruction relating to fire danger.*

The determination of ambulatory or nonambulatory status of persons with developmental disabilities shall be made by the Director of Social Services or his or her designated representative, in consultation with the Director of Developmental Services or his or her designated representative. The determination of ambulatory or nonambulatory status of all other disabled persons placed after January 1, 1984, who are not developmentally disabled shall be made by the Director of Social Services or his or her designated representative.

NONCOMBUSTIBLE. [SFM] *Noncombustible as applied to building construction material means a material which, in the form in which it is used, is either one of the following:*

1. *Material of which no part will ignite and burn when subjected to fire. Any material passing ASTM E136 shall be considered noncombustible.*
2. *Material having a structural base of noncombustible material as defined in Item 1 above, with a surfacing material not over $^1/_8$ inch (3.2 mm) thick which has a flame-spread index of 50 or less.*

"Noncombustible" does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to Item 1. No material shall be classed as noncombustible which is subject to increase in combustibility or flame-spread index, beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.

NON-PATIENT CARE SUITE. *In Group I-2 occupancies, a group of rooms or spaces within a suite for use as administrative, business and professional offices.*

NORMAL TEMPERATURE AND PRESSURE (NTP). A temperature of 70°F (21°C) and a pressure of 1 atmosphere [14.7 psia (101 kPa)].

[BE] NOSING. The leading edge of treads of stairs and of landings at the top of stairway flights.

NOTIFICATION ZONE. See "Zone, notification."

NUISANCE ALARM. An alarm caused by mechanical failure, malfunction, improper installation or lack of proper maintenance, or an alarm activated by a cause that cannot be determined.

[BG] NURSING HOMES. Facilities that provide care, including both intermediate care facilities and skilled nursing facilities, where any of the persons are incapable of self-preservation *or classified as nonambulatory or bedridden.*

[BG] OCCUPANT LOAD. The number of persons for which the means of egress of a building or portion thereof is designed.

OCCUPIABLE ROOF. An exterior space on a roof that is designed for human occupancy, other than maintenance or repair, and which is equipped with a means of egress system meeting the requirements of this code.

OPEN BURNING. The burning of materials wherein products of combustion are emitted directly into the ambient air without passing through a stack or chimney from an enclosed chamber. Open burning does not include road flares, smudgepots and similar devices associated with safety or occupational uses typically considered open flames, recreational fires or use of portable outdoor fireplaces. For the purpose of this definition, a chamber shall be regarded as enclosed when, during the time combustion occurs, only apertures, ducts, stacks, flues or chimneys necessary to provide combustion air and permit the escape of exhaust gas are open.

OPEN MALL. See "Covered mall building."

OPEN MALL BUILDING. See "Covered mall building."

[BG] OPEN PARKING GARAGE. A structure or portion of a structure with the openings as described in Section 406.5.2 of the *California Building Code* on two or more sides that is used for the parking or storage of private motor vehicles as described in Section 406.5 of the *California Building Code*.

OPEN SYSTEM. The use of a solid or liquid hazardous material involving a vessel or system that is continuously open to the atmosphere during normal operations and where vapors are liberated, or the product is exposed to the atmosphere during normal operations. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

OPEN-AIR ASSEMBLY SEATING. Seating served by means of egress that is not subject to smoke accumulation within or under a structure and is open to the atmosphere.

[BE] OPEN-ENDED CORRIDOR. An interior corridor that is open on each end and connects to an exterior stairway or ramp at each end with no intervening doors or separation from the corridor.

[BF] OPENING PROTECTIVE. A fire door assembly, fire shutter assembly, fire window assembly or glass-block assembly in a fire-resistance-rated wall or partition.

OPERATING BUILDING. A building occupied in conjunction with the manufacture, transportation or use of explosive materials. Operating buildings are separated from one another with the use of intraplant or intraline distances.

OPERATING LINE. A group of buildings, facilities or workstations so arranged as to permit performance of the steps in the manufacture of an explosive or in the loading, assembly, modification and maintenance of ammunition or devices containing explosive materials.

OPERATING PRESSURE. The pressure at which a system operates.

ORGANIC COATING. A liquid mixture of binders such as alkyd, nitrocellulose, acrylic or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone or alcohol, which, when spread in a thin film, convert to a durable protective and decorative finish.

ORGANIC PEROXIDE. An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.

Class I. Describes those formulations that are capable of deflagration but not detonation.

Class II. Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.

Class III. Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.

Class IV. Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.

Class V. Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.

Unclassified detonable. Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.

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OUTDOOR ASSEMBLY EVENT. An outdoor gathering of persons for any purpose.

OUTDOOR CONTROL AREA. An outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of Table 5003.1.1(3) or Table 5003.1.1(4).

OUTPATIENT CLINIC. See "Clinic, outpatient."

OVERCROWDING. A condition that exists when either there are more people in a building, structure or portion thereof than have been authorized or posted by the fire code official, or when the fire code official determines that a threat exists to the safety of the occupants due to persons sitting and/or standing in locations that may obstruct or impede the use of aisles, passages, corridors, stairways, exits or other components of the means of egress.

[BE] OVERHEAD DOORSTOP. Door hardware mounted at the top of the door and to the door frame that limits the swing of the door in the opening.

[A] OWNER. Any person, agent, operator, entity, firm or corporation having any legal or equitable interest in the property; or recorded in the official records of the state, county or municipality as holding an interest or title to the property; or otherwise having possession or control of the property, including the guardian of the estate of any such person, and the executor or administrator of the estate of such person if ordered to take possession of real property by a court.

OXIDIZER. A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.

Class 4. An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.

Class 3. An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.

Class 2. An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.

Class 1. An oxidizer that does not moderately increase the burning rate of combustible materials.

OXIDIZING CRYOGENIC FLUID. An oxidizing gas in the cryogenic state.

OXIDIZING GAS. A gas that can support and accelerate combustion of other materials more than air does.

OZONE-GAS GENERATOR. Equipment which causes the production of ozone.

[BE] PANIC HARDWARE. A door-latching assembly incorporating a device that releases the latch upon the application of a force in the direction of egress travel. See also "Fire exit hardware."

PASSIVE RF EMITTING DEVICE. A device that does not require an external AC or DC source of power for its operation, and does not provide amplification of the RF signal, including but not limited to coax, couplers, splitters and passive antennas.

PASS-THROUGH. An enclosure installed in a wall with a door on each side that allows chemicals, HPM, equipment, and parts to be transferred from one side of the wall to the other.

[A] PEER REVIEW. An independent and objective technical review conducted by an approved third party.

[BG] PENTHOUSE. An enclosed, unoccupied rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, and vertical shaft openings.

PERMANENT PORTABLE BUILDING. *A portable building that is used to serve or house students and is certified as a permanent building on a new public school campus by the public school administration shall comply with the requirements of new campus buildings.*

PERMISSIBLE EXPOSURE LIMIT (PEL). The maximum permitted 8-hour time-weighted-average concentration of an airborne contaminant. The exposure limits to be utilized are those published in DOL 29 CFR Part 1910.1000. The Recommended Exposure Limit (REL) concentrations published by the US National Institute for Occupational Safety and Health (NIOSH), Threshold Limit Value-Time Weighted Average (TLV-TWA) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), Workplace Environmental Exposure Level (WEEL) Guides published by the American Industrial Hygiene Association (AIHA), and other approved, consistent measures are allowed as surrogates for hazardous substances not listed in DOL 29 CFR Part 1910.1000.

[A] PERMIT. An official document or certificate issued by the fire code official that authorizes performance of a specified activity.

[A] PERSON. An individual, heirs, executors, administrators or assigns, and also includes a firm, partnership or corporation, its or their successors or assigns, or the agent of any of the aforesaid.

PERSONS WITH INTELLECTUAL DISABILITIES, PROFOUNDLY OR SEVERELY. *Shall mean any persons with intellectual disabilities who is unable to evacuate a building unassisted during emergency conditions.*

Note: *The determination as to such incapacity shall be made by the Director of the State Department of Public Health or his or her designated representative pursuant to Health and Safety Code Section 13131.3.*

[BG] PERSONAL CARE SERVICE. The care of persons who do not require medical care. Personal care involves responsibility for the safety of the persons while inside the building.

PESTICIDE. A substance or mixture of substances, including fungicides, intended for preventing, destroying, repelling or mitigating pests and substances or a mixture of substances intended for use as a plant regulator, defoliant or desiccant. Products defined as drugs in the Federal Food, Drug and Cosmetic Act are not pesticides.

[BE] PHOTOLUMINESCENT. Having the property of emitting light that continues for a length of time after excitation by visible or invisible light has been removed.

PHOTOVOLTAIC (PV) PANEL SYSTEM, GROUND-MOUNTED. *An independent photovoltaic (PV) panel system without useable space underneath, installed directly on the ground.*

PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED. *An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.*

PHYSICAL HAZARD. A chemical for which there is evidence that it is a combustible liquid, cryogenic fluid, explosive, flammable (solid, liquid or gas), organic peroxide (solid or liquid), oxidizer (solid or liquid), oxidizing gas, pyrophoric (solid, liquid or gas), unstable (reactive) material (solid, liquid or gas) or water-reactive material (solid or liquid).

PHYSIOLOGICAL WARNING THRESHOLD. A concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter (mg/m^3), that represents the concentration at which persons can sense the presence of the contaminant due to odor, irritation or other quick-acting physiological responses. When used in conjunction with the permissible exposure limit (PEL), the physiological warning threshold levels are those consistent with the classification system used to establish the PEL. See the definition of "Permissible exposure limit (PEL)."

PIER. A structure built over the water, supported by pillars or piles, and used as a landing place, pleasure pavilion or similar purpose.

PLACE OF RELIGIOUS WORSHIP. See "Religious worship, place of."

[M] PLENUM. An enclosed portion of the building structure, other than an occupiable space being conditioned, that is designed to allow air movement and thereby serve as part of an air distribution system.

PLOSOPHORIC MATERIAL. Two or more unmixed, commercially manufactured, prepackaged chemical substances including oxidizers, flammable liquids or solids, or similar substances that are not independently classified as explosives but which, when mixed or combined, form an explosive that is intended for blasting.

PLYWOOD AND VENEER MILLS. Facilities where raw wood products are processed into finished wood products, including waferboard, oriented strandboard, fiberboard, composite wood panels and plywood.

PORTABLE GENERATOR. A mobile internal combustion engine-driven device that provides temporary electrical power. This includes hand portable, wheeled, trailer mounted, and motor vehicle-mounted generator sets. It does not include generators in permanent, fixed installations.

PORTABLE OUTDOOR FIREPLACE. A portable, outdoor, solid-fuel-burning fireplace that may be constructed of steel, concrete, clay or other noncombustible material. A portable outdoor fireplace may be open in design, or may be equipped with a small hearth opening and a short chimney or chimney opening in the top.

[BE] POWER-ASSISTED DOOR. Swinging door that opens by reduced pushing or pulling force on the door-operating hardware. The door closes automatically after the pushing or pulling force is released, and functions with decreased forces. See also "Low-energy power-operated door" and "Power-operated door."

POWERED INDUSTRIAL TRUCK. A forklift, tractor, platform lift truck or motorized hand truck powered by an electrical motor or internal combustion engine. Powered industrial trucks do not include farm vehicles or automotive vehicles for highway use.

POWERED MICROMOBILITY DEVICES. Motorized bicycles, motorized scooters and other personal mobility devices powered by a lithium-ion or lithium metal battery. The term does not include motor vehicles that are required to be registered with the Department of Motor Vehicles for the state or jurisdiction

[BE] POWER-OPERATED DOOR. Swinging, sliding, or folding door that opens automatically when approached by a pedestrian or opens automatically upon an action by a pedestrian. The door closes automatically and includes provisions such as presence sensors to prevent entrapment. See also "Low-energy power-operated door" and "Power-assisted door."

PRESSURE VESSEL. A closed vessel designed to operate at pressures above 15 psig (103 kPa).

PRIMARY CONTAINMENT. The first level of containment, consisting of the inside portion of that container which comes into immediate contact on its inner surface with the material being contained.

[BG] PRIVATE GARAGE. A building or portion of a building in which motor vehicles used by the owner or tenants of the building or buildings on the premises are stored or kept, without provisions for repairing or servicing such vehicles for profit.

PROCESS TRANSFER. The transfer of flammable or combustible liquids between tank vehicles or tank cars and process operations. Process operations may include containers, tanks, piping and equipment.

PROPELLANT. The liquefied or compressed gas in an aerosol container that expels the contents from an aerosol container when the valve is actuated. A propellant is considered flammable if it forms a flammable mixture with air, or if a flame is self-propagating in a mixture with air.

PROTECTIVE SOCIAL CARE FACILITY. *A facility housing persons, who are referred, placed or caused to be placed in the facility, by any governmental agency and for whom the services, or a portion thereof, are paid for by any governmental agency. These occupancies shall include, but are not limited to, those commonly referred to as "assisted living facilities," "social rehabilitation facilities," "certified family care homes," "out-of-home placement facilities," and "halfway houses."*

PROXIMATE AUDIENCE. An audience closer to pyrotechnic devices than allowed by *Chapter 56.*

[B] PSYCHIATRIC HOSPITALS. See "Hospitals and psychiatric hospitals."

PUBLIC TRAFFIC ROUTE (PTR). Any public street, road, highway, navigable stream or passenger railroad that is used for through traffic by the general public.

[A] PUBLIC WAY. A street, alley or other parcel of land open to the outside air leading to a street, that has been deeded, dedicated or otherwise permanently appropriated to the public for public use and which has a clear width and height of not less than 10 feet (3048 mm).

[BE] PUBLIC-USE AREAS. Interior or exterior rooms or spaces that are made available to the general public.

PUZZLE ROOM. A puzzle room is a type of special amusement area in which occupants are encouraged to solve a challenge to escape from a room or series of rooms. A puzzle room is sometimes referred to as an escape room.

PYROPHORIC. A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).

PYROTECHNIC ARTICLE. A pyrotechnic device for use in the entertainment industry, which is not classified as fireworks.

PYROTECHNIC COMPOSITION. A chemical mixture that produces visible light displays or sounds through a self-propagating, heat-releasing chemical reaction which is initiated by ignition.

PYROTECHNIC SPECIAL EFFECT. A visible or audible effect for entertainment created through the use of pyrotechnic materials and devices.

PYROTECHNIC SPECIAL-EFFECT MATERIAL. A chemical mixture used in the entertainment industry to produce visible or audible effects by combustion, deflagration or detonation. Such a chemical mixture predominantly consists of solids capable of producing a controlled, self-sustaining and self-contained exothermic chemical reaction that results in heat, gas sound, light or a combination of these effects. The chemical reaction functions without external oxygen.

PYROTECHNICS. Controlled exothermic chemical reactions timed to create the effects of heat, hot gas, sound, dispersion of aerosols, emission of visible light or a combination of such effects to achieve the maximum effect from the least volume of pyrotechnic composition.

QUANTITY-DISTANCE (Q-D). The quantity of explosive material and separation distance relationships providing protection. These relationships are based on levels of risk considered acceptable for the stipulated exposures and are tabulated in the appropriate Q-D tables. The separation distances specified afford less than absolute safety:

Inhabited building distance (IBD). The minimum separation distance between an operating building or magazine containing explosive materials and an inhabited building or site boundary.

Intermagazine distance (IMD). The minimum separation distance between magazines.

Intraline distance (ILD) or Intraplant distance (IPD). The distance to be maintained between any two operating buildings on an explosives manufacturing site when at least one contains or is designed to contain explosives, or the distance between a magazine and an operating building.

RADIO FREQUENCY (RF). A measurement representing the oscillation rate of the electromagnetic radiation spectrum, or electromagnetic radio waves, from public safety frequency bands as specified by the fire code official.

RAILWAY. A steam, electric or other railroad or railway that carriers passengers for hire. *Also see Chapter 56 for "railway" as it relates to explosives.*

[BE] RAMP. A walking surface that has a running slope steeper than 1 unit vertical in 20 units horizontal (5-percent slope).

RAMP, EXIT ACCESS. See "Exit access ramp."

RAMP, EXTERIOR EXIT. See "Exterior exit ramp."

RAMP, INTERIOR EXIT. See "Interior exit ramp."

RAW PRODUCT. A mixture of natural materials such as tree, brush trimmings, or waste logs and stumps.

[M] READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see "Access (to)"].

READY BOX. A weather-resistant container with a self-closing or automatic-closing cover that protects fireworks shells from burning debris. Tarpaulins shall not be considered as ready boxes.

[A] RECORD DRAWINGS. Drawings ("as builts") that document the location of all devices, appliances, wiring, sequences, wiring methods and connections of the components of a fire alarm system as installed.

RECREATIONAL FIRE. An outdoor fire burning materials other than rubbish where the fuel being burned is not contained in an incinerator, outdoor fireplace, portable outdoor fireplace, barbeque grill or barbeque pit and has a total fuel area of 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height for pleasure, religious, ceremonial, cooking, warmth or similar purposes.

REDUCED FLOW VALVE. A valve equipped with a restricted flow orifice and inserted into a compressed gas cylinder, portable tank or stationary tank that is designed to reduce the maximum flow from the valve under full-flow conditions. The maximum flow rate from the valve is determined with the valve allowed to flow to atmosphere with no other piping or fittings attached.

REFINERY. A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

REFRIGERANT. The fluid used for heat transfer in a refrigeration system that undergoes a change of state to absorb heat.

[M] REFRIGERATION SYSTEM. A combination of interconnected parts in which a refrigerant is enclosed and is circulated for the purpose of extracting then rejecting heat.

[A] REGISTERED DESIGN PROFESSIONAL. An architect or engineer, registered or licensed to practice professional architecture or engineering, as defined by the statutory requirements of the professional registration laws of the state in which the project is to be constructed.

[BG] RELIGIOUS WORSHIP, PLACE OF. A building or portion thereof intended for the performance of religious services.

RELOCATABLE BUILDING (PUBLIC SCHOOL). *Any building with an integral floor structure which is capable of being readily moved. (See Education Code Section 17350.) Relocatable buildings that are to be placed on substandard foundations not complying with the requirements of Part 2, Title 24, C.C.R., require a statement from the school district stating that the durability requirements for those foundations may be waived and acknowledging the temporary nature of the foundations.*

RELOCATABLE POWER TAP. A relocatable electrical enclosure that provides one or more receptacle outlets and that is provided with an attached power supply cord and attachment plug for connection to a permanently installed receptacle outlet (also called a "multi-plug adaptor").

REMOTE EMERGENCY SHUTOFF DEVICE. The combination of an operator-carried signaling device and a mechanism on the tank vehicle. Activation of the remote emergency shutoff device sends a signal to the tanker-mounted mechanism and causes fuel flow to cease.

REMOTE SOLVENT RESERVOIR. A liquid solvent container enclosed against evaporative losses to the atmosphere during periods when the container is not being utilized, except for a solvent return opening not larger than 16 square inches (10 322 mm^2). Such return allows pump-cycled used solvent to drain back into the reservoir from a separate solvent sink or work area.

REMOTELY LOCATED, MANUALLY ACTIVATED SHUTDOWN CONTROL. A control system that is designed to initiate shutdown of the flow of gases or liquids that is manually activated from a point located some distance from the delivery system.

REPAIR GARAGE. A building, structure or portion thereof used for servicing or repairing motor vehicles.

RESIDENTIAL CARE FACILITY FOR THE CHRONICALLY ILL (RCF/CI). *As termed, means a housing arrangement with a maximum capacity of 25 residents that provides a range of services to residents who have chronic, life-threatening illnesses.*

RESIDENTIAL CARE FACILITY FOR THE ELDERLY (RCFE). *As defined in Health and Safety Code Section §1569.2, shall mean a facility with a housing arrangement chosen voluntarily by persons 60 years of age or over, or their authorized representative, where varying levels and intensities of care and supervision, protective supervision or personal care are provided, based on their varying needs, as determined in order to be admitted and to remain in the facility. Persons under 60 years of age with compatible needs, as determined by the Department of Social Services in regulations, may be allowed to be admitted or retained in a residential-care facility for the elderly.*

Pursuant to Health and Safety Code Section §13133, regulations of the State Fire Marshal pertaining to Group R-2.1 occupancies classified as Residential Facilities (RF) and Residential-care Facilities for the Elderly (RCFE) shall apply uniformly throughout the state and no city, county, city and county, including a charter city or charter county, or fire protection district shall adopt or enforce any ordinance or local rule or regulation relating to fire and panic safety which is in consistent with these regulations. A city, county, city and county, including a charter city or charter county may pursuant to Health and Safety Code Section §13143.5, or a fire protection district may pursuant to Health and Safety Code Section §13869.7, adopt standards more stringent than those adopted by the state fire marshal that are reasonably necessary to accommodate local climate, geological or topographical conditions relating to roof coverings for Residential-care Facilities for the Elderly.

RESIDENTIAL FACILITY (RF). *As defined in Section §1502 of the Health and Safety Code, shall mean any family home, group care facility or similar facility determined by the director of Social Services, for 24-hour nonmedical care of persons in need of personal services, supervision or assistance essential for sustaining the activities of daily living or for the protection of the individual. Such facilities include small family homes and social rehabilitation facilities.*

Pursuant to Health and Safety Code Section §13133, regulations of the state fire marshal pertaining to Group R, Division 2 Occupancies classified as Residential Facilities (RF) and Residential-care Facilities for the Elderly (RCFE) shall apply uniformly throughout the state and no city, county, city and county, including a charter city or charter county or fire protection district shall adopt or enforce any ordinance or local rule or regulation relating to fire and panic safety which is in consistent with these regulations. A city, county, city and county, including a charter city or charter county may pursuant to Health and Safety Code Section §13143.5, or a fire protection district may pursuant to Health and Safety Code Section §13869.7, adopt standards more stringent than those adopted by the state fire marshal that are reasonably necessary to accommodate local climate, geological or topographical conditions relating to roof coverings for Residential-care Facilities for the Elderly.

RESIN APPLICATION AREA. An area where reinforced plastics are used to manufacture products by hand lay-up or spray-fabrication methods.

RESPONSIBLE PERSON. A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to issuing permits as part of the hot work permit program and following up as the job progresses.

RETAIL DISPLAY AREA. The area of a Group M occupancy open for the purpose of viewing or purchasing merchandise offered for sale. Individuals in such establishments are free to circulate among the items offered for sale which are typically displayed on shelves, racks or the floor.

RESTRAINT. [SFM]. *The physical retention of a person within a room, cell or cell block, holding cells, temporary holding cell, rooms or area, holding facility, secure interview rooms, courthouse holding facilities, courtroom docks or similar buildings or portions thereof by any means, or within the exterior walls of a building by means of locked doors inoperable by the person restrained. Restraint shall also mean the physical binding, strapping or similar restriction of any person in a chair, walker, bed or other contrivance for the purpose of deliberately restricting the free movement of ambulatory persons.*

Restraint shall not be construed to include nonambulatory persons nor shall it include the use of bandage material, strip sheeting or other fabrics or materials (soft ties) used to restrain persons in hospital-type beds or wheelchairs to prevent injury, provided an approved method of quick release is maintained.

Facilities employing the use of soft ties, however, shall be classified as a building used to house nonambulatory persons. Restraint shall not be practiced in licensed facilities classified as Group R-2.1, R-3.1 and R-4 occupancies unless constructed as a Group I-3 occupancy. For Group I-3 Occupancies see California Building Code Section 408.1.1.

ROADSIDE HYDROGEN SERVICE VEHICLES. *Approved vehicles used for dispensing of compressed gaseous hydrogen at partial pressure into the fuel tanks of hydrogen-fueled vehicles from on-board hydrogen supply tanks.*

ROLL COATING. The process of coating, spreading and impregnating fabrics, paper or other materials as they are passed directly through a tank or trough containing flammable or combustible liquids, or over the surface of a roller revolving partially submerged in a flammable or combustible liquid.

RUBBISH (TRASH). Combustible and noncombustible waste materials, including residue from the burning of coal, wood, coke or other combustible material, paper, rags, cartons, tin cans, metals, mineral matter, glass crockery, dust and discarded refrigerators, and heating, cooking or incinerator-type appliances.

SAFETY CAN. An approved container of not more than 5-gallon (19 L) capacity having a spring-closing lid and spout cover so designed that it will relieve internal pressure when subjected to fire exposure.

SAFETY DATA SHEET (SDS). Information concerning a hazardous material which is prepared in accordance with the provisions of DOL 29 CFR Part 1910.1200 or in accordance with the provisions of a federally approved state OSHA plan. A document titled as a Material Safety Data Sheet (MSDS) is equivalent to an SDS for the purposes of this code.

[BE] SCISSOR STAIRWAY. Two interlocking stairways providing two separate paths of egress located within one exit enclosure.

SECONDARY CONTAINMENT. That level of containment that is external to and separate from primary containment.

SECURE INTERVIEW ROOM. *A lockable room used to hold and interview detainees for further processing.*

SEED COTTON. See "Cotton."

SEGREGATED. Storage in the same room or inside area, but physically separated by distance from incompatible materials.

[BF] SELF-CLOSING. As applied to a fire door or other opening, means equipped with an approved device that will ensure closing after having been opened.

[BE] SELF-LUMINOUS. Illuminated by a self-contained power source, other than batteries, and operated independently of external power sources.

SELF-PRESERVATION, INCAPABLE OF. See "Incapable of self-preservation."

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY. That portion of motor fuel-dispensing facility where liquid motor fuels are dispensed from fixed approved dispensing equipment into the fuel tanks of motor vehicles by persons other than a motor fuel-dispensing facility attendant.

SEMICONDUCTOR FABRICATION FACILITY. A building or a portion of a building in which electrical circuits or devices are created on solid crystalline substances having electrical conductivity greater than insulators but less than conductors. These circuits or devices are commonly known as semiconductors.

SERVICE CORRIDOR. A fully enclosed passage used for transporting HPM and purposes other than required means of egress.

SHELF STORAGE. Storage on shelves less than 30 inches (762 mm) deep with the distance between shelves not exceeding 3 feet (914 mm) vertically. For other shelving arrangements, see the requirements for rack storage.

SINGLE-STATION SMOKE ALARM. An assembly incorporating the detector, the control equipment and the alarm-sounding device in one unit, operated from a power supply either in the unit or obtained at the point of installation.

[BG] SITE. A parcel of land bounded by a lot line or a designated portion of a public right-of-way.

SITE SAFETY PLAN. A plan developed to establish a fire prevention program at a construction site.

[BG] SITE-FABRICATED STRETCH SYSTEM. A system, fabricated on site and intended for acoustical, tackable or aesthetic purposes, that is composed of three elements:

1. A frame constructed of plastic, wood, metal or other material used to hold fabric in place.
2. A core material (infill, with the correct properties for the application).
3. An outside layer, comprised of a textile, fabric or vinyl, that is stretched taut and held in place by tension or mechanical fasteners via the frame

SKY LANTERN. An unmanned device with a fuel source that incorporates an open flame in order to make the device airborne.

[BG] SLEEPING UNIT. A single unit providing rooms or spaces for one or more persons that includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

SMALL ARMS AMMUNITION. ***[California Code of Regulations, Title 19, Division 1, §1559.19 (a) Small arms ammunition]***

§1559.19 (a) Small arms ammunition *shall mean ammunition of 75 caliber or less when designated as a Division 1.4 explosive by the US DOTn which includes a shotgun, rifle or pistol cartridge and any cartridge for propellant-actuated devices.*

SMALL ARMS PRIMERS. Small percussion-sensitive explosive charges, encased in a cap, used to ignite propellant powder.

SMALL MANAGEMENT YARD. *An exterior exercise yard within a Group I-3 prison used for inmate exercise for a maximum of 2 hours per day, constructed in accordance with California Building Code Section 408.15.*

SMOKE ALARM. A single- or multiple-station alarm responsive to smoke. See also "Single-station smoke alarm" and "Multiple-station smoke alarm."

[BF] SMOKE BARRIER. A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

[BG] SMOKE COMPARTMENT. A space within a building separated from other interior areas of the building by smoke barriers, including interior walls and horizontal assemblies.

[BF] SMOKE DAMPER. A listed device installed in ducts and air transfer openings designed to resist the passage of smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a fire command center.

SMOKE DETECTOR. A listed device that senses visible or invisible particles of combustion.

SMOKE PARTITION. A wall assembly that extends from the top of the foundation or floor below to the underside of the floor or roof sheathing, deck or slab above or to the underside of the ceiling above where the ceiling membrane is constructed to limit the transfer of smoke.

[BG] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84.

SMOKELESS PROPELLANTS. Solid propellants, commonly referred to as smokeless powders, used in small arms ammunition, cannons, rockets, propellant-actuated devices and similar articles.

[BF] SMOKEPROOF ENCLOSURE. An interior exit stairway designed and constructed so that the movement of the products of combustion produced by a fire occurring in any part of the building into the enclosure is limited.

[BE] SMOKE-PROTECTED ASSEMBLY SEATING. Seating served by means of egress that is not subject to smoke accumulation within or under a structure for a specified design time by means of passive design or by mechanical ventilation.

SOLID. A material that has a melting point and decomposes or sublimes at a temperature greater than 68°F (20°C).

SOLID BIOFUEL. Densified biomass made in the form of cubiform, polyhedral, polyhydric or cylindrical units, produced by compressing milled biomass.

SOLID BIOMASS FEEDSTOCK. The basic materials of which solid biofuel is composed, manufactured or made.

SOLID SHELVING. Shelving that is solid, slatted or of other construction located in racks and which obstructs sprinkler discharge down into the racks.

SOLVENT DISTILLATION UNIT. An appliance that receives contaminated flammable or combustible liquids and which distills the contents to remove contaminants and recover the solvents.

SOLVENT OR LIQUID CLASSIFICATIONS. A method for classifying solvents or liquids according to the following classes:

Class I solvents. Liquids having a flash point below 100°F (38°C).

Class II solvents. Liquids having a flash point at or above 100°F (38°C) and below 140°F (60°C).

Class IIIA solvents. Liquids having a flash point at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB solvents. Liquids having a flash point at or above 200°F (93°C).

Class IV solvents. Liquids classified as nonflammable.

SPECIAL AMUSEMENT AREA. A temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and is arranged in a manner that meets one or more of the following descriptions:

1. Makes the means of egress path not readily apparent due to visual or audio distractions.
2. Intentionally confounds identification of the means of egress path.
3. Otherwise makes the means of egress path not readily available because of the nature of the attraction or mode of conveyance through the building or structure.

[A] SPECIAL EXPERT. An individual who has demonstrated qualifications in a specific area, outside the practice of architecture or engineering, through education, training and experience.

SPECIAL INDUSTRIAL EXPLOSIVE DEVICE. An explosive power pack containing an explosive charge in the form of a cartridge or construction device. The term includes but is not limited to explosive rivets, explosive bolts, explosive charges for driving pins or studs, cartridges for explosive-actuated power tools and charges of explosives used in automotive air bag inflators, jet tapping of open hearth furnaces and jet perforation of oil well casings.

SPRAY BOOTH. A mechanically ventilated appliance of varying dimensions and construction provided to enclose or accommodate a spraying operation and to confine and limit the escape of spray vapor and residue and to exhaust it safely.

SPRAY ROOM. A room designed to accommodate spraying operations, constructed in accordance with the *California Building Code*.

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SPRAYING SPACE. An area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes. The fire code official is authorized to define the limits of the spraying space in any specific case.

SPRINKLER EXPRESS RISER. A vertical pipe used to supply water to sprinkler systems in a multiple-story building.

[BE] STAIR. A change in elevation, consisting of one or more risers.

[BE] STAIRWAY. One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting them, to form a continuous and uninterrupted passage from one level to another.

STAIRWAY, EXIT ACCESS. See "Exit access stairway."

STAIRWAY, EXTERIOR EXIT. See "Exterior exit stairway."

STAIRWAY, INTERIOR EXIT. See "Interior exit stairway."

STAIRWAY, SCISSOR. See "Scissor stairway."

[BE] STAIRWAY, SPIRAL. A stairway having a closed circular form in its plan view with uniform section-shaped treads attached to and radiating from a minimum-diameter supporting column.

STANDBY POWER SYSTEM. A source of automatic electric power of a required capacity and duration to operate required building, hazardous materials or ventilation systems in the event of a failure of the primary power. Standby power systems are required for electrical loads where interruption of the primary power could create hazards or hamper rescue or firefighting operations.

STANDPIPE, TYPES OF. Standpipe types are as follows:

Automatic dry. A dry standpipe system, normally filled with pressurized air, that is arranged through the use of a device, such as a dry pipe valve, to admit water into the system piping automatically upon the opening of a hose valve. The water supply for an automatic dry standpipe system shall be capable of supplying the system demand.

Automatic wet. A wet standpipe system that has a water supply that is capable of supplying the system demand automatically.

Manual dry. A dry standpipe system that does not have a permanent water supply attached to the system. Manual dry standpipe systems require water from a fire department pumper to be pumped into the system through the fire department connection in order to supply the system demand.

Manual wet. A wet standpipe system connected to a water supply for the purpose of maintaining water within the system but which does not have a water supply capable of delivering the system demand attached to the system. Manual wet standpipe systems require water from a fire department pumper (or the like) to be pumped into the system in order to supply the system demand.

Semiautomatic dry. A dry standpipe system that is arranged through the use of a device, such as a deluge valve, to admit water into the system piping upon activation of a remote control device located at a hose connection. A remote control activation device shall be provided at each hose connection. The water supply for a semiautomatic dry standpipe system shall be capable of supplying the system demand.

STANDPIPE SYSTEM, CLASSES OF. Standpipe system classes are as follows:

Class I system. A system providing $2^1/_2$-inch (64 mm) hose connections to supply water for use by fire departments and those trained in handling heavy fire streams.

Class II system. A system providing $1^1/_2$-inch (38 mm) hose stations to supply water for use primarily by the building occupants or by the fire department during initial response.

Class III system. A system providing $1^1/_2$-inch (38 mm) hose stations to supply water for use by building occupants and $2^1/_2$-inch (64 mm) hose connections to supply a larger volume of water for use by fire departments and those trained in handling heavy fire streams.

STATE-OWNED/LEASED BUILDING. *A building or portion of a building that is owned, leased or rented by the state. State-leased buildings shall include all required exits to a public way serving such leased area or space. Portions of state- leased buildings that are not leased or rented by the state shall not be included within the scope of this section unless such portions present an exposure hazard to the state-leased area or space.*

STATIC PILES. Piles in which processed wood product or solid biomass feedstock is mounded and is not being turned or moved.

STEEL. Hot- or cold-rolled as defined by the *California Building Code*.

STORAGE, HAZARDOUS MATERIALS. The keeping, retention or leaving of hazardous materials in closed containers, tanks, cylinders, or similar vessels; or vessels supplying operations through closed connections to the vessel.

[BG] STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above (see "Basement," "Building height," "Grade plane" and "Mezzanine"). A story is measured as the vertical distance from top to top of two successive tiers of beams or finished floor surfaces and, for the topmost story, from the top of the floor finish to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters.

[BG] STORY ABOVE GRADE PLANE. Any story having its finished floor surface entirely above grade plane, or in which the finished surface of the floor next above is:

1. More than 6 feet (1829 mm) above grade plane; or
2. More than 12 feet (3658 mm) above the finished ground level at any point.

SUBORDINATE (FIRE PROTECTION AND LIFE SAFETY SYSTEM). A system that is activated by another fire protection or life safety system. For example, where a fire alarm system activates a smoke removal or elevator recall system, the smoke removal or elevator recall system is considered to be "subordinate" to the fire alarm system.

SUPERVISING STATION. A facility that receives signals and at which personnel are in attendance at all times to respond to these signals.

SUPERVISORY SERVICE. The service required to monitor performance of guard tours and the operative condition of fire protection systems or other systems for the protection of life and property.

SUPERVISORY SIGNAL. A signal indicating the need of action in connection with the supervision of guard tours, the fire protection systems or equipment, or the maintenance features of related systems.

SUPERVISORY SIGNAL-INITIATING DEVICE. An initiating device such as a valve supervisory switch, water level indicator, or low-air pressure switch on a dry-pipe sprinkler system whose change of state signals an off-normal condition and its restoration to normal of a fire protection or life safety system; or a need for action in connection with guard tours, fire protection systems or equipment, or maintenance features of related systems.

SYSTEM. An assembly of equipment consisting of a tank, container or containers, appurtenances, pumps, compressors and connecting piping.

TANK. A vessel containing more than 60 gallons (227 L).

TANK, ATMOSPHERIC. A storage tank designed to operate at pressures from atmospheric through 1.0 pound per square inch gauge (760 mm Hg through 812 mm Hg) measured at the top of the tank.

TANK, MOTOR VEHICLE FUEL. A tank permanently mounted on a motor vehicle to store a gas or liquid fuel that is used for propulsion.

TANK, PORTABLE. A packaging of more than 60-gallon (227 L) capacity and designed primarily to be loaded into or on or temporarily attached to a transport vehicle or ship and equipped with skids, mountings or accessories to facilitate handling of the tank by mechanical means. It does not include any cylinder having less than a 1,000-pound (454 kg) water capacity, cargo tank, tank car tank or trailers carrying cylinders of more than 1,000-pound (454 kg) water capacity.

TANK, PRIMARY. A listed atmospheric tank used to store liquid. See "Primary containment."

TANK, PROTECTED ABOVE GROUND. A tank listed in accordance with UL 2085 consisting of a primary tank provided with protection from physical damage and fire-resistive protection from a high-intensity liquid pool fire exposure. The tank may provide protection elements as a unit or may be an assembly of components, or a combination thereof.

TANK, STATIONARY. Packaging designed primarily for stationary installations not intended for loading, unloading or attachment to a transport vehicle as part of its normal operation in the process of use. It does not include cylinders having less than a 1,000-pound (454 kg) water capacity.

TANK IN AN UNDERGROUND AREA. *A tank located in a structure that is at least 10 percent below the ground surface, including, but not limited to, a basement, cellar, shaft, pit or vault.*

Note: *A tank in an underground area shall have the same meaning as defined in Health and Safety Code Section 25270.2(o)(1) for the applications specified in Sections 2306.6.2.7, 5703.4.1 and 5703.6.2.2 of this code.*

Exceptions:

1. *A pressure vessel or boiler that is subject to Labor Code, Division 5, Part 6 (commencing with Section 7620).*
2. *A tank containing hazardous waste or extremely hazardous waste, as respectively defined in Health and Safety Code Sections 25117 and 25115, if the Department of Toxic Substances Control has issued the person owning or operating the tank a hazardous waste facilities permit for the tank.*
3. *An aboveground oil production tank that is subject to Public Resources Code Section 3106.*
4. *Oil-filled electrical equipment, including but not limited to transformers, circuit breakers or capacitors, if the oil-filled electrical equipment meets either of the following conditions:*
   - 4.1. *The equipment contains less than 10,000 gallons of dielectric fluid.*
   - 4.2. *The equipment contains 10,000 gallons or more of dielectric fluid with polychlorinated biphenyl levels less than 50 parts per million, appropriate containment or diversionary structures or equipment are employed to prevent discharged oil from reaching a navigable water course, and the electrical equipment is visually inspected in accordance with the usual routine maintenance procedures of the owner or operator.*
5. *A tank regulated as an underground storage tank under Health and Safety Code Division 20, Chapter 6.7 (commencing with Section 25280) and the California Code of Regulations, Title 23, Division 3, Chapter 16 (commencing with Section 2610) and that does not meet the definition of a tank in an underground area.*
6. *A transportation-related tank facility, subject to the authority and control of the United States Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the United States Environmental Protection Agency, as set forth in the Code of Federal Regulations, Title 40, Chapter I, Subchapter D, Part 112 (commencing with Section 112.1).*
7. *A tank or tank facility located on and operated by a farm that is exempt from the federal spill, prevention, control and countermeasure rule requirements pursuant to the Code of Federal Regulations, Title 40, Chapter I, Subchapter D, Part 112 (commencing with Section 112.1).*

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TANK VEHICLE. A vehicle other than a railroad tank car or boat, with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable or combustible liquids, LP-gas or hazardous chemicals. Tank vehicles include self-propelled vehicles and full trailers and semitrailers, with or without motive power, and carrying part or all of the load.

TEMPORARY HOLDING CELL, ROOM or AREA [BSCC and SFM]. *Temporary Holding cell, room or area shall mean a room for temporary holding of inmates, detainees or in-custody individuals for less than 24 hours.*

TEMPORARY HOLDING FACILITY [SFM]. *A building or portion of a building, operated by law enforcement personnel, with one or more temporary holding cells or rooms.*

TEMPORARY SPECIAL EVENT STRUCTURE. Any temporary ground-supported structure, platform, stage, stage scaffolding or rigging, canopy, tower supporting audio or visual effects equipment or similar structures not regulated within the scope of the *California Building Code*.

TENABLE ENVIRONMENT [SFM]. *Tenable environment shall mean an environment in which the products of combustion, toxic gases, smoke and heat are limited or otherwise restricted to maintain the impact on occupants to a level that is not life threatening.*

TENT. A structure, enclosure, umbrella structure or shelter, with or without sidewalls or drops, constructed of fabric or pliable material supported in any manner except by air or the contents it protects (see "Umbrella structure").

[California Code of Regulations, Title 19, Division 1, §310.(a) through (c)] Definitions.

(a) Tent. A shelter, structure or enclosure made of fabric or similar pliable material.

(b) Large tent. A tent designed for use by 10 or more people.

(c) Small tent. A tent designed for use by less than 10 people.

TERMINALLY ILL. *As termed for an individual, means the individual has a life expectancy of six months or less as stated in writing by his or her attending physician and surgeon.*

THEFT RESISTANT. Construction designed to deter illegal entry into facilities for the storage of explosive materials.

[BF] THROUGH-PENETRATION FIRESTOP SYSTEM. An assemblage consisting of a fire-resistance-rated floor, floor-ceiling or wall assembly, one or more penetrating items passing through the breaches in both sides of the assembly and the materials or devices, or both, installed to resist the spread of fire through the assembly for a prescribed period of time.

TIMBER AND LUMBER PRODUCTION FACILITIES. Facilities where raw wood products are processed into finished wood products.

TIRES, BULK STORAGE OF. Storage of tires where the area available for storage exceeds 20,000 cubic feet (566 m^3).

TODDLER. *Any child between 18 months and 36 months of age.*

TOOL. A device, storage container, workstation or process machine used in a fabrication area.

TORCH-APPLIED ROOF SYSTEM. Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

[A] TOWNHOUSE. A building that contains three or more attached townhouse units.

[A] TOWNHOUSE UNIT. A single-family dwelling unit in a townhouse that extends from the foundation to the roof and has a yard or public way on not fewer than two sides.

TOXIC. A chemical falling within any of the following categories:

1. A chemical that has a median lethal dose (LD_{50}) of more than 50 milligrams per kilogram, but not more than 500 milligrams per kilogram of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
2. A chemical that has a median lethal dose (LD_{50}) of more than 200 milligrams per kilogram but not more than 1,000 milligrams per kilogram of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between 2 and 3 kilograms each.
3. A chemical that has a median lethal concentration (LC_{50}) in air of more than 200 parts per million but not more than 2,000 parts per million by volume of gas or vapor, or more than 2 milligrams per liter but not more than 20 milligrams per liter of mist, fume or dust, when administered by continuous inhalation for 1 hour (or less if death occurs within 1 hour) to albino rats weighing between 200 and 300 grams each.

TRAFFIC CALMING DEVICES. Traffic calming devices are design elements of fire apparatus access roads such as street alignment, installation of barriers, and other physical measures intended to reduce traffic and cut-through volumes, and slow vehicle speeds.

[BG] TRANSIENT. Occupancy of a dwelling unit or sleeping unit for not more than 30 days.

[BG] TRANSIENT AIRCRAFT. Aircraft based at another location and that is at the transient location for not more than 90 days.

TRANSVERSE FLUE SPACE. See "Flue spaces, Transverse."

TRASH. See "Rubbish (trash)."

TROUBLE SIGNAL. A signal initiated by the fire alarm system or device indicative of a fault in a monitored circuit or component.

TUBE TRAILER. A semitrailer on which a number of tubular gas cylinders have been mounted. A manifold is typically provided that connects the cylinder valves enabling gas to be discharged from one or more tubes or cylinders through a piping and control system.

TWENTY-FOUR-HOUR BASIS. See "24-hour basis" before the "A" entries.

UMBRELLA STRUCTURE. A structure, enclosure or shelter with or without sidewalls or drops, constructed of fabric or pliable material supported by a central pole or poles (see "Tent").

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UNAUTHORIZED DISCHARGE. A release or emission of materials in a manner which does not conform to the provisions of this code or applicable public health and safety regulations.

UNSTABLE (REACTIVE) MATERIAL. A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:

Class 4. Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperature and pressure. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperature and pressure.

Class 3. Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures.

Class 2. Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperature and pressure, and that can undergo violent chemical change at elevated temperature and pressure.

Class 1. Materials that in themselves are normally stable but which can become unstable at elevated temperature and pressure.

UNWANTED FIRE. A fire not used for cooking, heating or recreational purposes or one not incidental to the normal operations of the property.

UPLINK. The signal from the portable to the base station/tower site.

USE (MATERIAL). Placing a material into action, including solids, liquids and gases.

VALET TRASH COLLECTION. An intermediary service that removes trash or recycling materials placed outside of dwelling units or sleeping units for final collection.

VAPOR PRESSURE. The pressure exerted by a volatile fluid as determined in accordance with ASTM D323.

VEGETATIVE ROOF. A roof assembly of interacting components designed to waterproof a building's top surface that includes, by design, a vegetative surface.

[M] VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

VERTICAL WATER SUPPLY ZONE. A vertical fire protection zone within the standpipe system or group of floors supplied by a single sprinkler express riser in a high-rise building established by pressure limitations based on the design.

VESSEL. A motorized watercraft, other than a seaplane on the water, used or capable of being used as a means of transportation. Nontransportation vessels, such as houseboats and boathouses, are included in this definition.

VISIBLE ALARM NOTIFICATION APPLIANCE. A notification appliance that alerts by the sense of sight.

WAITING ROOM. [SFM] *Waiting room is a room or area normally provided with seating and used for persons waiting.*

WATER MIST SYSTEM, AUTOMATIC. See "Automatic water mist system."

WATER-REACTIVE MATERIAL. A material that explodes; violently reacts; produces flammable, toxic or other hazardous gases; or evolves enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture. Water-reactive materials are subdivided as follows:

Class 3. Materials that react explosively with water without requiring heat or confinement.

Class 2. Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition or ignition of combustibles upon exposure to water or moisture.

Class 1. Materials that react with water with some release of energy, but not violently.

WET FUELING. See "Mobile fueling."

WET HOSING. See "Mobile fueling."

WET-CHEMICAL EXTINGUISHING AGENT. A solution of water and potassium-carbonate-based chemical, potassium-acetate-based chemical or a combination thereof, forming an extinguishing agent.

WHARF. A structure or bulkhead constructed of wood, stone, concrete or similar material built at the shore of a harbor, lake or river for vessels to lie alongside of, and to anchor piers or floats.

WILDFIRE RISK AREA. Land that is covered with grass, grain, brush or forest, whether privately or publicly owned, which is so situated or is of such inaccessible location that a fire originating upon it would present an abnormally difficult job of suppression or would result in great or unusual damage through fire or such areas designated by the fire code official.

WILDLAND-URBAN INTERFACE AREA (WUI). [SFM] *(See California Wildland-Urban Interface Code Chapter 2 for defined term.)*

[BE] WINDER. A tread with nonparallel edges.

WINERY CAVES. *A subterranean space for winery facilities in natural or manmade caves shall be in accordance with Section 446 of the California Building Code.*

WIRELESS PROTECTION SYSTEM. A system or a part of a system that can transmit and receive signals without the aid of wire.

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WORKSTATION. A defined space or an independent principal piece of equipment using HPM within a fabrication area where a specific function, laboratory procedure or research activity occurs. Approved or listed hazardous materials storage cabinets, flammable liquid storage cabinets or gas cabinets serving a workstation are included as part of the workstation. A workstation is allowed to contain ventilation equipment, fire protection devices, detection devices, electrical devices and other processing and scientific equipment.

[BG] YARD. An open space, other than a court, unobstructed from the ground to the sky, except where specifically provided by the *California Building Code*, on the lot on which a building is situated.

ZONE. A defined area within the protected premises. A zone can define an area from which a signal can be received, an area to which a signal can be sent or an area in which a form of control can be executed.

ZONE, NOTIFICATION. An area within a building or facility covered by notification appliances which are activated simultaneously.

SECTION 203—OCCUPANCY CLASSIFICATION AND USE

[BG] 203.1 Occupancy classification. Occupancy classification is the formal designation of the primary purpose of the building, structure or portion thereof. Structures shall be classified into one or more of the occupancy groups specified in this section based on the nature of the hazards and risks to building occupants generally associated with the intended purpose of the building or structure. An area, room or space that is intended to be occupied at different times for different purposes shall comply with all applicable requirements associated with such potential multipurpose. Structures containing multiple occupancy groups shall comply with Section 508 of the *California Building Code*. Where a structure is proposed for a purpose that is not specified in this section, such structure shall be classified in the occupancy it most nearly resembles based on the fire safety and relative hazard. Occupiable roofs shall be classified in the group that the occupancy most nearly resembles, according to the fire safety and relative hazard, and shall comply with Section 503.1.4 of the *California Building Code*.

1. Assembly: Groups A-1, A-2, A-3, A-4 and A-5.
2. Business: Group B.
3. Educational: Group E.
4. Factory and Industrial: Groups F-1 and F-2.
5. High Hazard: Groups H-1, H-2, H-3, H-4 and H-5.
6. Institutional: Groups I-1, I-2, I-3 and I-4.
7. Mercantile: Group M.
8. Residential: Groups R-1, R-2, R-3 and R-4.
9. Storage: Groups S-1 and S-2.
10. Utility and Miscellaneous: Group U.

[BG] 203.1.1 Use designation. Occupancy groups contain subordinate uses having similar hazards and risks to building occupants. Uses include, but are not limited to, those functional designations specified within the occupancy group descriptions in Section 203.1. Certain uses require specific limitations and controls in accordance with the provisions of this code and Chapter 4 of the *California Building Code*.

[BG] 203.2 Assembly Group A. Assembly Group A occupancy includes, among others, the use of a building or structure, or a portion thereof, for the gathering of persons for purposes such as civic, social or religious functions; recreation, food or drink consumption or awaiting transportation *or Motion Picture and Television Production Studio Sound Stages, Approved Production Facilities and production locations. Any building or structure or portion thereof used or intended to be used for the showing of motion pictures when an admission fee is charged and when such building or structure is open to the public and has a capacity of 10 or more persons.*

[BG] 203.2.1 Small buildings and tenant spaces. A building or tenant space used for assembly purposes with an occupant load of less than 50 persons shall be classified as a Group B occupancy.

[BG] 203.2.2 Small assembly spaces. The following rooms and spaces shall not be classified as Assembly occupancies:

1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.
2. A room or space used for assembly purposes that is less than 750 square feet (70 m^2) in area and accessory to another occupancy shall be classified as a Group B occupancy or as part of that occupancy.

[BG] 203.2.3 Associated with Group E occupancies. A room or space used for assembly purposes that is associated with a Group E occupancy is not considered a separate occupancy.

[BG] 203.2.4 Accessory to places of religious worship. Accessory religious educational rooms and religious auditoriums with occupant loads of less than 100 per room or space are not considered separate occupancies.

[BG] 203.2.5 Special amusement areas. Special amusement areas shall comply with Section 411 of the *California Building Code*

[BG] 203.2.6 Assembly Group A-1. Group A-1 occupancy includes assembly uses, usually with fixed seating, intended for the production and viewing of the performing arts or motion pictures, including but not limited to:

Motion picture and television production studio Sound Stages, Approved Production Facilities and production locations. (With live audiences.)

Motion picture theaters

Symphony and concert halls

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Television and radio studios admitting an audience

Theaters

[BG] 203.2.7 Assembly Group A-2. Group A-2 occupancy includes assembly uses intended for food and/or drink consumption, including but not limited to:

Banquet halls

Casinos (gaming areas)

Nightclubs

Restaurants, cafeterias and similar dining facilities (including associated commercial kitchens)

Taverns and bars

[BG] 203.2.8 Assembly Group A-3. Group A-3 occupancy includes assembly uses intended for worship, recreation or amusement and other assembly uses not classified elsewhere in Group A, including but not limited to:

Amusement arcades

Art galleries

Bowling alleys

Community halls

Courtrooms

Dance halls (not including food or drink consumption)

Exhibition halls

Funeral parlors

Greenhouses for the conservation and exhibition of plants that provide public access

Gymnasiums (without spectator seating)

Indoor swimming pools (without spectator seating)

Indoor tennis courts (without spectator seating)

Lecture halls

Libraries

Museums

Places of religious worship

Pool and billiard parlors

Waiting areas in transportation terminals

[BG] 203.2.9 Assembly Group A-4. Group A-4 occupancy includes assembly uses intended for viewing of indoor sporting events and activities with spectator seating, including but not limited to:

Arenas

Skating rinks

Swimming pools

Tennis courts

[BG] 203.2.10 Assembly Group A-5. Group A-5 occupancy includes assembly uses intended for participation in or viewing outdoor activities, including but not limited to:

Amusement park structures

Bleachers

Fixed guideway transit systems. [SFM] *Fixed guideway transit system buildings shall conform to the requirements of this code for their occupancy classification in addition to the provisions set forth in Section 443 of the California Building Code.*

Grandstands

Stadiums

Subterranean spaces for winery facilities in natural or manmade caves. [SFM] *For fire and life safety requirements, see Section 446 of the California Building Code.*

[BG] 203.3 Business Group B. Business Group B occupancy includes, among others, the use of a building or structure, or a portion thereof, for office, professional or service-type transactions, including storage of records and accounts. Business occupancies shall include, but not be limited to, the following:

Airport traffic control towers

Ambulatory care facilities

Animal hospitals, kennels and pounds

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Banks

Barber and beauty shops

Car wash

Civic administration

Clinic-outpatient

Dry cleaning and laundries: pick-up and delivery stations and self-service

➡ Educational occupancies for students above the 12th grade

Electronic data entry

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities not more than 2,500 square feet (232 m²) in area.

Laboratories: testing and research *and **[SFM]** instruction.*

Lithium-ion or lithium metal battery testing, research and development

Motor vehicle showrooms

Post offices

Print shops

Professional services (architects, attorneys, dentists, physicians, engineers, etc.)

Radio and television stations

Telephone exchanges

Training and skill development not in a school or academic program (This shall include, but not be limited to, tutoring centers, martial arts studios, gymnastics and similar uses regardless of the ages served, and where not classified as a Group A occupancy.)

[BG] 203.3.1 Airport traffic control towers. Airport traffic control towers shall comply with Section 412.2 of the *California Building Code*.

[BG] 203.3.2 Ambulatory care facilities. Ambulatory care facilities shall comply with Section 422 of the *California Building Code*.

➡ **[BG] 203.4 Educational Group E.** Educational Group E occupancy includes, among others, the use of a building or structure, or a portion thereof, *more than six* persons at any one time for educational purposes through the 12th grade.

***Exception:** A residence used as a home school for the children who normally reside at the residence. Such residences shall remain classified as Group R-2, or Group R-3 occupancies.*

[BG] 203.4.1 Accessory to places of religious worship. Religious educational rooms and religious auditoriums, which are accessory to places of religious worship in accordance with Section 303.1.4 of the *California Building Code* and have occupant loads of less than 100 per room or space shall be classified as Group A-3 occupancies.

[BG] 203.4.2 Group E, *child*-care facilities. This group includes buildings and structures or portions thereof occupied by more than *six* children *36 months* of age *and older* who receive educational, supervision or personal care services for fewer than 24 hours per day.

***Exception: [SFM]** A child-care facility not otherwise classified as a Group R-3 occupancy, where occupants are not capable of responding to an emergency situation without physical assistance from the staff shall be classified as Group I-4. Infants and toddlers are allowed in a Group E child care when the requirements of California Fire Code Section 203.4.2.1, 203.4.2.2, 203.4.2.3, or 203.7.4.1 are met.*

[BG] 203.4.2.1 Within places of religious worship. Rooms and spaces within places of religious worship providing such day care during religious functions shall be classified as part of the primary occupancy *where not licensed for child-care purposes by the Department of Social Services.*

[BG] 203.4.2.2 Five or fewer children. A facility having five or fewer children receiving such day care shall be classified as part of the primary occupancy.

[BG] 203.4.2.3 Five or fewer children in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer children receiving such day care shall be classified as a Group R-3 occupancy or shall comply with the *California Residential Code*.

[BG] 203.4.3 Storm shelters in Group E occupancies. Storm shelters shall be provided for Group E occupancies where required by Section 423.4 of the *California Building Code*.

[BG] 203.5 Factory Industrial Group F. Factory Industrial Group F occupancy includes, among others, the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as a Group H hazardous or Group S storage occupancy.

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[BG] 203.5.1 Moderate-hazard factory industrial, Group F-1. Factory industrial uses that are not classified as Factory Industrial F-2 Low Hazard shall be classified as F-1 Moderate Hazard and shall include, but not be limited to, the following:

Aircraft (manufacturing, not to include repair)

Appliances

Athletic equipment

Automobiles and other motor vehicles

Bakeries

Beverages: over 20-percent alcohol content

Bicycles

Boats

Brooms or brushes

Business machines

Cameras and photo equipment

Canvas or similar fabric

Carpets and rugs (includes cleaning)

Clothing

Construction and agricultural machinery

Disinfectants

Dry cleaning and dyeing

Electric generation plants

Electronics

Energy storage systems (ESS) in dedicated use buildings

Energy storage systems (ESS) and equipment containing lithium-ion or lithium metal batteries

Engines (including rebuilding)

Food processing establishments and commercial kitchens not associated with restaurants, cafeterias and similar dining facilities more than 2,500 square feet (232 m^2) in area

Furniture

Hemp products

Jute products

Laundries

Leather products

Lithium-ion batteries

Machinery

Metals

Millwork (sash and door)

Motion picture and television production studio Sound Stages, Approved Production Facilities and production locations (without live audiences)

Motion pictures and television filming (without spectators)

Musical instruments

Optical goods

Paper mills or products

Photographic film

Plastic products

Printing or publishing

Recreational vehicles

Refuse incineration

Shoes

Soaps and detergents

Textiles

Tobacco

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Trailers

Upholstering

Vehicles powered by lithium-ion or lithium metal batteries

Water/sewer treatment facilities

Wood; distillation

Woodworking (cabinet)

[BG] 203.5.1.1 Aircraft manufacturing facilities. Aircraft manufacturing facilities shall comply with Section 412.6 of the *California Building Code*.

[BG] 203.5.2 Low-hazard factory industrial, Group F-2. Factory industrial uses that involve the fabrication or manufacturing of noncombustible materials that during finishing, packing or processing does not involve a significant fire hazard shall be classified as Group F-2 occupancies and shall include, but not be limited to, the following:

Beverages: up to and including 20-percent alcohol content

Brick and masonry

Ceramic products

Foundries

Glass products

Gypsum

Ice

Metal products (fabrication and assembly)

203.6 High-hazard Group H. High-hazard Group H occupancy includes, among others, the use of a building or structure, or a portion thereof, that involves the manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed in control areas complying with Section 5003.8.3, based on the maximum allowable quantity limits for control areas set forth in Tables 5003.1.1(1) and 5003.1.1(2). Hazardous occupancies are classified in Groups H-1, H-2, H-3, H-4 and H-5 and shall be in accordance with this code and the requirements of Section 415 of the *California Building Code*. Hazardous materials stored or used on top of roofs or canopies shall be classified as rooftop storage or use and shall comply with this code.

203.6.1. Occupancy exemptions. Storage, use and handling of hazardous materials in accordance with Table 307.1.1 of the *California Building Code* shall not be counted as contributing to maximum allowable quantities and shall not cause classification of an occupancy to be Group H. Such storage, use and handling shall comply with applicable provisions of this code.

203.6.2 Hazardous materials. Hazardous materials in any quantity shall conform to the requirements of this code and Section 414 of the *California Building Code*.

203.6.3 High-hazard Group H-1. Buildings and structures containing materials that pose a detonation hazard shall be classified as Group H-1. Such materials shall include, but not be limited to, the following:

Detonable pyrophoric materials

Explosives:

Division 1.1

Division 1.2

Division 1.3

Division 1.4

Division 1.5

Division 1.6

Organic peroxides, unclassified detonable

Oxidizers, Class 4

Unstable (reactive) materials, Class 3 detonable and Class 4

203.6.3.1 Occupancies containing explosives not classified as H-1. The following occupancies containing explosive materials shall be classified as follows:

1. Division 1.3 explosive materials that are used and maintained in a form where either confinement or configuration will not elevate the hazard from a mass fire to mass explosion hazard shall be allowed in Group H-2 occupancies.
2. Division 1.4 explosive materials shall be allowed in Group H-3 occupancies.
3. Articles, including articles packaged for shipment, that are not regulated as a Division 1.4 explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles shall be allowed in Group H-3 occupancies.

203.6.4 High-hazard Group H-2. Buildings and structures containing materials that pose a deflagration hazard or a hazard from accelerated burning shall be classified as Group H-2. Such materials shall include, but not be limited to, the following:

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Class I, II or IIIA flammable or combustible liquids that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103.4 kPa)

Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *California Building Code.*

Cryogenic fluids, flammable

Category 1A flammable gases

Category 1B flammable gases having a burning velocity greater than 3.9 inches per second (99 mm/s)

Organic peroxides, Class I

Oxidizers, Class 3, that are used or stored in normally open containers or systems, or in closed containers or systems pressurized at more than 15 pounds per square inch gauge (103 kPa)

Pyrophoric liquids, solids and gases, nondetonable

Unstable (reactive) materials, Class 3, nondetonable

Water-reactive materials, Class 3

203.6.5 High-hazard Group H-3. Buildings and structures containing materials that readily support combustion or that pose a physical hazard shall be classified as Group H-3. Such materials shall include, but not be limited to, the following:

Class I, II or IIIA flammable or combustible liquids that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103.4 kPa) or less

Combustible fibers, other than densely packed baled cotton, where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 414.1.3 of the *California Building Code*

Consumer fireworks, 1.4G (Class C, Common)

Cryogenic fluids, oxidizing

Category 1B flammable gases having a burning velocity of 3.9 inches per second (99 mm/s) or less

Flammable solids

Organic peroxides, Class II and III

Oxidizers, Class 2

Oxidizers, Class 3, that are used or stored in normally closed containers or systems pressurized at 15 pounds per square inch gauge (103 kPa) or less

Oxidizing gases

Unstable (reactive) materials, Class 2

Water-reactive materials, Class 2

203.6.6 High-hazard Group H-4. Buildings and structures containing materials that are health hazards shall be classified as Group H-4. Such materials shall include, but not be limited to, the following:

Corrosives

Highly toxic materials

Toxic materials

203.6.7 High-hazard Group H-5. Semiconductor fabrication facilities and comparable research and development areas in which hazardous production materials (HPM) are used and the aggregate quantity of materials is in excess of those specified in Tables 5003.1.1(1) and 5003.1.1(2) shall be classified as Group H-5. Such facilities and areas shall be designed and constructed in accordance with Section 415.11 of the *California Building Code*.

203.6.8 Multiple hazards. Buildings and structures containing a material or materials representing hazards that are classified in one or more of Groups H-1, H-2, H-3 and H-4 shall conform to the code requirements for each of the occupancies so classified.

[BG] 203.7 Institutional Group I. Institutional Group I occupancy includes, among others, the use of a building or structure, or a portion thereof, in which care or supervision is provided to persons who are or are incapable of self-preservation without physical assistance or in which persons are detained for penal or correctional purposes or in which the liberty of the occupants is restricted. Institutional occupancies shall be classified as Group I-2, I-3 or I-4. *Restraint shall not be permitted in any building except in Group I-2 occupancies constructed for such use in accordance with Section 407.1.1 of the California Building Code and Group I-3 occupancies constructed for such use, in accordance with Section 408.1.2 of the California Building Code.*

Where occupancies house both ambulatory and nonambulatory persons, the more restrictive requirements shall apply.

[BG] 203.7.1 Institutional Group I-1. *Not used. (See Group R-2.1 or Section 310.1 of the California Building Code)*

[BG] 203.7.2 Institutional Group I-2. Institutional Group I-2 occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are incapable of self-preservation *or classified as nonambulatory or bedridden*. This group shall include, but not be limited to, the following:

Foster care facilities

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Detoxification facilities

Hospitals

Nursing homes

Psychiatric hospitals

[BG] 203.7.2.1 Reserved.

[BG] 203.7.2.2 Five or fewer persons receiving medical care. A facility with five or fewer persons receiving medical care shall be classified as Group R-3*.1* or shall comply with the *California Residential Code* provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 of this code or Section *R309* of the *California Residential Code*.

[BG] 203.7.3 Institutional Group I-3. Institutional Group I-3 occupancy shall include buildings *or portions of buildings* and structures that are inhabited *by one or more* persons who are under restraint or security. A Group I-3 facility is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupants' control *which includes persons restrained*. This group shall include, but not be limited to, the following:

Correctional centers

Courthouse holding facilities

Detention centers

Detention treatment rooms

Jails

Juvenile halls

Prerelease centers

Prisons

Reformatories

Secure interview rooms

Temporary holding facilities

Buildings of Group I-3 shall be classified as one of the occupancy conditions specified in Sections 203.7.3.1 through 203.7.3.5 and shall comply with Section 408 of the *California Building Code*.

[BG] 203.7.3.1 Condition 1. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and other spaces where access or occupancy is permitted to the exterior via means of egress without restraint. A Condition 1 facility is permitted to be constructed as Group R.

[BG] 203.7.3.2 Condition 2. This occupancy condition shall include buildings in which free movement is allowed from sleeping areas and any other occupied smoke compartment to one or more other smoke compartments. Egress to the exterior is impeded by locked exits.

[BG] 203.7.3.3 Condition 3. This occupancy condition shall include buildings in which free movement is allowed within individual smoke compartments, such as within a residential unit comprised of individual sleeping units and group activity spaces, where egress is impeded by remote-controlled release of means of egress from such smoke compartment to another smoke compartment.

[BG] 203.7.3.4 Condition 4. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Remote-controlled release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

[BG] 203.7.3.5 Condition 5. This occupancy condition shall include buildings in which free movement is restricted from an occupied space. Staff-controlled manual release is provided to permit movement from sleeping units, activity spaces and other occupied areas within the smoke compartment to other smoke compartments.

203.7.3.6 Condition 6. *This occupancy condition shall include buildings containing only one temporary holding facility with five or less persons under restraint or security where the building is protected throughout with a monitored automatic sprinkler system installed in accordance with Section 903.3.1.1 and where the temporary holding facility is protected throughout with an automatic fire alarm system with notification appliances. A Condition 6 building shall be permitted to be classified as a Group B occupancy.*

203.7.3.7 Condition 7. *This occupancy condition shall include buildings containing only one temporary holding facility with nine or less persons under restraint or security where limited to the first or second story, provided the building complies with Section 408.1.2.6 of the California Building Code. A Condition 7 building shall be permitted to be classified as a Group B occupancy.*

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203.7.3.8 Condition 8. *This occupancy condition shall include buildings containing not more than four secure interview rooms located within the same fire area where not more than six occupants under restraint are located in the same fire area. A Condition 8 building shall be permitted to be classified as a Group B occupancy, provided the requirements in Section 408.1.2.7 of the California Building Code are met.*

[BG] 203.7.4 Institutional Group I-4, day care facilities. Institutional Group I-4 shall include buildings and structures occupied by more than *six clients* of any age who receive custodial care for *fewer* than 24 hours by persons other than parents or guardians, relatives by blood, marriage, or adoption, and in a place other than the home of the *clients* cared for. This group shall include, but not be limited to, the following:

Adult day care

Child day care *(not classified as a Group E)*

[BG] 203.7.4.1 Classification as Group E. A child day care facility that provides care for more than *six* but not more than 100 children *under 36 months of age,* where the rooms in which the children are cared for are located on a level of exit discharge serving such rooms and each of these child care rooms have an exit door directly to the exterior, shall be classified as Group E.

Special provisions. *See Section 452.1.4 of the California Building Code for child-care locations above or below the first story.*

[BG] 203.7.4.2 Within a place of religious worship. Rooms and spaces within places of religious worship providing such care during religious functions shall be classified as part of the primary occupancy.

[BG] 203.7.4.3 Five or fewer persons receiving care. A facility having five or fewer persons receiving custodial care shall be classified as part of the primary occupancy.

[BG] 203.7.4.4 Five or fewer persons receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the *California Residential Code*.

[BG] 203.8 Mercantile Group M. Mercantile Group M occupancy includes, among others, the use of a building or structure or a portion thereof, for the display and sale of merchandise, and involves stocks of goods, wares or merchandise incidental to such purposes and where the public has access. Mercantile occupancies shall include, but not be limited to, the following:

Department stores

Drug stores

Greenhouses with public access that maintain plants for display and sale

Markets

Motor fuel-dispensing facilities

Retail or wholesale stores

Sales rooms

[BG] 203.8.1 Quantity of hazardous materials. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored or displayed in a single control area of a Group M occupancy shall not exceed the quantities in Table 5704.3.4.1.

[BG] 203.8.2 Motor fuel-dispensing facilities. Motor fuel-dispensing facilities shall comply with Section 406.7 of the *California Building Code*.

[BG] 203.9 Residential Group R. Residential Group R includes, among others, the use of a building or structure, or a portion thereof, for sleeping purposes when not classified as an Institutional Group I or when not regulated by the *California Residential Code* in accordance with Section 101.2 of the *California Building Code*. Group R occupancies not constructed in accordance with the *California Residential Code* as permitted by Sections 310.4.1 and 310.4.2 of the *California Building Code* shall comply with Section 420 of the *California Building Code*.

[BG] 203.9.1 Residential Group R-1. Residential Group R-1 occupancies containing sleeping units or more than two dwelling units where the occupants are primarily transient in nature, including:

Boarding houses (transient) with more than 10 occupants

Congregate *residences* (transient) with more than 10 occupants

Hotels (transient)

Motels (transient)

Lodging houses with more than five guestrooms

[BG] 203.9.2 Residential Group R-2. Residential Group R-2 occupancies containing sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including:

Apartment houses

Large family child care
Small family child care

Congregate *residences* (nontransient) with more than 16 occupants

Boarding houses (nontransient)

Boarding houses (nontransient)

Convents

Dormitories

Emergency services living quarters

Fraternities and sororities

Monasteries

Hotels (nontransient) with more than five guestrooms

Live/work units

Motels (nontransient) with more than five guestrooms

Vacation timeshare properties

203.9.2.1 Residential Group R-2.1. *Residential Group R-2.1 occupancies shall include buildings, structures or parts thereof housing clients, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services.*

This occupancy may contain more than six nonambulatory and/or bedridden clients. (See Appendix Chapter 4, Section 435 Special Provisions for Licensed 24-Hour Care Facilities in a Group R-2.1, R-3.1 or R-4 occupancy). This group shall include, but not be limited to, the following:

Assisted living facilities such as:

Residential Care Facilities
Residential Care Facilities for the Elderly (RCFEs)
Adult Residential Facilities
Congregate Living Health facilities
Group homes
Residential Care Facilities for the Chronically Ill
Congregate Living Health Facilities for the Terminally Ill

Social rehabilitation facilities such as:

Halfway houses
Community Correctional Centers
Community Treatment Programs
Work Furlough Programs
Alcoholism or drug abuse recovery or treatment facilities

203.9.2.2 Residential Group R-2.2 (CDCR Only). *Residential occupancies operated by CDCR in a community located facility that provides housing and community based program services for non-transient ambulatory participants in a non-licensed facility with 24/7 supervision Community Correctional Reentry Centers.*

[BG] 203.9.3 Residential Group R-3. Residential Group R-3 occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, *R-2.1, R-2.2, R-3.1,* R-4 or I, including:

Buildings that do not contain more than two dwelling units

Care facilities that provide accommodations for five or fewer persons receiving care

Congregate *residences* (nontransient) with 16 or fewer occupants

Boarding houses (nontransient)

Convents

Dormitories

Emergency services living quarters

Fraternities and sororities

Monasteries

Congregate *residences* (transient) with 10 or fewer occupants

Boarding houses (transient)

Lodging houses with five or fewer guestrooms

Adult care facilities that provide accommodations for six or fewer clients of any age for less than 24 hours.

Licensing categories that may use this classification include, but are not limited to:
Adult Day Programs

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Child-care facilities that provide accommodations for six or fewer clients of any age for less than 24 hours.

Licensing categories that may use this classification include, but are not limited to:

Day-Care Center for Mildly Ill Children
Adult Day Programs
Infant Care Center
School Age Child Day-Care Center.

Alcoholism or drug abuse recovery homes (ambulatory only)

Family Day-Care Homes that provide accommodations for 14 or fewer children, in the provider's own home for less than 24-hours.

Adult care and child-care facilities that are within a single-family home are permitted to comply with the California Residential Code.

Hotels (nontransient) with five or fewer guestrooms

Motels (nontransient) with five or fewer guestrooms

[BG] 203.9.3.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the *California Residential Code* provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 of this code or Section *R309* of the *California Residential Code*.

[BG] 203.9.3.2 Lodging houses. Owner-occupied lodging houses with five or fewer guestrooms shall be constructed in accordance with the *California Building Code* or the *California Residential Code*, provided that facilities constructed using the *California Residential Code* are protected by an automatic sprinkler system installed in accordance with Section *R309* of the *California Residential Code*.

203.9.3.3 Residential Group R-3.1. *Residential Group R-3.1 occupancies may include facilities licensed by a governmental agency for a residentially based 24-hour care facility providing accommodations for six or fewer clients of any age. Clients may be classified as ambulatory, nonambulatory or bedridden. A Group R-3.1 occupancy shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in Appendix Chapter 4, Section 425, Special Provisions For Licensed 24-Hour Care Facilities in a Group R-2.1, R-3.1 or R-4 occupancy. This group may include:*

Adult Residential Facilities

Congregate Living Health Facilities

Intermediate Care Facilities for the Developmentally Disabled Habilitative

Intermediate Care Facilities for the Developmentally Disabled Nursing

Nurseries for the full-time care of children under the age of six, but not including "infants" as defined in Chapter 2

Residential Care Facilities for the Elderly (RCFEs)

Small Family Homes and Residential Care Facilities for the Chronically Ill

Exception: *Group Homes licensed by the Department of Social Services which provide nonmedical board, room and care for six or fewer ambulatory children or children two years of age or younger, and which do not have any nonambulatory clients shall not be subject to regulations found in Appendix Chapter 4, Section 435.*

Pursuant to Health and Safety Code Section 13143 with respect to these exempted facilities, no city, county or public district shall adopt or enforce any requirement for the prevention of fire or for the protection of life and property against fire and panic unless the requirement would be applicable to a structure regardless of the special occupancy. Nothing shall restrict the application of state or local housing standards to such facilities if the standards are applicable to residential occupancies and are not based on the use of the structure as a facility for ambulatory children. For the purpose of this exception, ambulatory children do not include relatives of the licensee or the licensee's spouse.

[BG] 203.9.4 Residential Group R-4. Residential Group R-4 shall include buildings, structures or portions thereof for more than five but not more than *six ambulatory clients,* excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. Buildings of Group R-4 shall be classified as one of the occupancy conditions specified in Section 203.9.4.1 or 203.9.4.2. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the *California Building Code*. *The persons receiving care are capable of self-preservation. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in the California Building Code. This occupancy classification may include a maximum six nonambulatory or bedridden clients (see Appendix Chapter 4, Section 435, Special Provisions For Licensed 24-Hour Care Facilities in a Group R-2.1, R-3.1 or R-4 occupancy).* This group shall include, but not be limited to, the following:

Alcohol and drug centers

Assisted living facilities *such as:*

Residential care facilities
Residential Care Facilities for the Elderly (RCFEs)
Adult Residential Facilities
Congregate Living Health facilities
Group homes

Congregate care facilities

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Group homes

Halfway houses

Residential board and care facilities

Social rehabilitation facilities *such as:*

Halfway houses
Community Treatment Programs
Work Furlough Programs
Alcoholism or drug abuse recovery or treatment facilities

➡ **[BG] 203.10 Storage Group S.** Storage Group S occupancy includes, among others, the use of a building or structure, or a portion thereof, for storage that is not classified as a hazardous occupancy.

[BG] 203.10.1 Accessory storage spaces. A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.

[BG] 203.10.2 Combustible storage. High-piled stock or rack storage, or attic, under-floor and concealed spaces used for storage of combustible materials, shall be in accordance with Section 413 of the *California Building Code*.

[BG] 203.10.3 Moderate-hazard storage, Group S-1. Storage Group S-1 occupancies are buildings occupied for storage uses that are not classified as Group S-2, including, but not limited to, storage of the following:

Aerosols, Levels 2 and 3, aerosol cooking spray, plastic aerosol 3 (PA3)

Aircraft hangar (storage and repair)

Bags: cloth, burlap and paper

Bamboos and rattan

Baskets

Belting: canvas and leather

Beverages over 20-percent alcohol content

Books and paper in rolls or packs

Boots and shoes

Buttons, including cloth covered, pearl or bone

Cardboard and cardboard boxes

Clothing, woolen wearing apparel

Cordage

Dry boat storage (indoor)

Furniture

Furs

Glues, mucilage, pastes and size

Grains

Horns and combs, other than celluloid

Leather

Linoleum

Lithium-ion or lithium metal batteries

Lumber

Motor vehicle repair garages complying with the maximum allowable quantities of hazardous materials specified in Table 5003.1.1(1) (see Section 406.8 of the *California Building Code*)

Photo engravings

Resilient flooring

Self-service storage facility (mini-storage)

Silks

Soaps

Sugar

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Tires, bulk storage of

Tobacco, cigars, cigarettes and snuff

Upholstery and mattresses

Vehicle repair garages for vehicles powered by lithium-ion or lithium metal batteries

Wax candles

[BG] 203.10.3.1 Aircraft hangars. Aircraft hangars used for storage or repair shall comply with Section 412.3 of the *California Building Code*.

[BG] 203.10.3.2 Motor vehicle repair garages. Motor vehicle repair garages shall comply with Section 406.8 of the *California Building Code.*

[BG] 203.10.4 Low-hazard storage, Group S-2. Storage Group S-2 occupancies include, among others, buildings used for the storage of noncombustible materials, such as products on wood pallets or in paper cartons with or without single thickness divisions, or in paper wrappings. Such products are permitted to have a negligible amount of plastic trim, such as knobs, handles or film wrapping. Storage uses shall include, but not be limited to, storage of the following:

Asbestos

Beverages up to and including 20-percent alcohol

Cement in bags

Chalk and crayons

Dairy products in non-waxed coated paper containers

Dry cell batteries

Electrical coils

Electrical motors

Empty cans

Food products

Foods in noncombustible containers

Fresh fruits and vegetables in non-plastic trays or containers

Frozen foods

Glass

Glass bottles, empty or filled with noncombustible liquids

Gypsum board

Inert pigments

Ivory

Meats

Metal cabinets

Metal desks with plastic tops and trim

Metal parts

Metals

Mirrors

Oil-filled and other types of distribution transformers

Public parking garages, open or enclosed

Porcelain and pottery

Stoves

Talc and soap stones

Washers and dryers

[BG] 203.10.4.1 Public parking garages. Public parking garages shall comply with Section 406.4 of the *California Building Code* and the additional requirements of Section 406.5 of the *California Building Code* for open parking garages or Section 406.6 of the *California Building Code* for enclosed parking garages.

[BG] 203.11 Miscellaneous Group U. Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy shall be constructed, equipped and maintained to conform to the requirements of this code commensurate with the fire and life hazard incidental to their occupancy. Group U shall include, but not be limited to, the following:

Agricultural buildings

Aircraft hangar, accessory to a one- or two-family residence (see Section 412.4 of the *California Building Code*)

Barns

Carports

Communication equipment structures with a gross floor area of less than 1,500 square feet (139 m^3)

Fences more than 7 feet (2134 mm) in height

Grain silos, accessory to a residential occupancy

Livestock shelters

Private garages

Retaining walls

Sheds

Stables

Tanks

Towers

[BG] 203.11.1 Greenhouses. Greenhouses not classified as another occupancy shall be classified as Use Group U.

[BG] 203.11.2 Private garages and carports. Private garages and carports shall comply with Section 406.3 of the *California Building Code*.

[BG] 203.11.3 Residential aircraft hangars. Aircraft hangars accessory to a one- or two-family residence shall comply with Section 412.4 of the *California Building Code*.

203.12 Laboratories Group L. [SFM] *Group L occupancy includes the use of a building or structure, or a portion thereof containing one or more laboratory suites as defined in Section 453 of the California Building Code.*

203.13 Organized Camps Group C. [SFM] *An organized camp is a site with programs and facilities established for the primary purpose of providing an outdoor group living experience with social, spiritual, educational or recreational objectives, for five days or more during one or more seasons of the year. See California Building Code Section 450, Group C occupancy.*

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 3 – GENERAL REQUIREMENTS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below			**X**																				
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
301			X																				
[T-19 §3.14]				X																			
[T-19 §3.19 (a-g)]				X																			
302			X																				
304			X																				
[T-19 §3.07(a)]				X																			
[T-19 §3.07(b)]				X																			
[T-19 §3.19 (b)(c)]				X																			
308.1.1			X																				
[T-19 §3.25 (a)(b)]				X																			
308.5			X																				
310.2			X																				
[T-19 §3.32 (a)(b)]				X																			
[T-19 §3.32 (d)]				X																			
310.3			X																				
[T-19 §3.32 (c)]				X																			
312 - 316			X																				
[T-19 §3.05 (b)]				X																			
317			X																				
319 - 322			X																				
323			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

3 GENERAL REQUIREMENTS

User notes:

About this chapter: Chapter 3 provides general requirements for asphalt kettles, combustible waste material, ignition sources, motion picture projection rooms and film, open burning, recreational fires, portable outdoor fireplaces, open flames, powered industrial trucks and equipment, smoking, vacant premises, vehicle impact protection, fueled equipment, indoor displays, general storage, outdoor pallet storage, hazards to firefighters, landscaped roofs, laundry carts, mobile food preparation vehicles, additive manufacturing (3D printing) and artificial combustible vegetation. These are intended to improve premises safety for everyone, including construction workers, tenants, operations and maintenance personnel, and emergency response personnel.

SECTION 301—GENERAL

301.1 Scope. The provisions of this chapter shall govern the occupancy and maintenance of all structures and premises for precautions against fire and the spread of fire and general requirements of fire safety.

[California Code of Regulations, Title 19, Division 1, §3.14] Fire Hazard.

No person, including but not limited to the State and its political subdivisions, operating any occupancy subject to California Code of Regulations, Title 19, Division 1 regulations shall permit any fire hazard, as defined in this article, to exist on premises under their control, or fail to take immediate action to abate a fire hazard when requested to do so by the enforcing agency.

***Note:** "Fire Hazard" as used in California Code of Regulations, Title 19, Division 1 regulations means any condition, arrangement, or act which will increase, or may cause an increase of, the hazard or menace of fire to a greater degree than customarily recognized as normal by persons in the public service of preventing, suppressing or extinguishing fire; or which may obstruct, delay or hinder, or may become the cause of obstruction, delay or hindrance to the prevention, suppression, or extinguishment of fire.*

[California Code of Regulations, Title 19, Division 1, §3.19(a) through (g)] Housekeeping.

Every building or portion of a building governed by California Code of Regulations, Title 19, Division 1 regulations shall be maintained in a neat orderly manner, free from any condition that would create a fire or life hazard or a condition which would add to or contribute to the rapid spread of fire. Provisions shall be made for the proper storage and disposal of waste materials and rubbish consistent with the following:

(a) All basements, cellars, floors, closets, attics, and other similar places not open to continuous observation shall be kept free from combustible litter and rubbish at all times.

***Note:** Such storage may be permitted in these areas only when protected by approved automatic extinguishing systems or fire-resistive separations.*

(b) All combustible waste material and rubbish shall be stored in approved containers or shall be stored in a manner approved by the enforcing agency as being consistent with standard fire prevention practices until such waste material and rubbish is removed from the premises or otherwise disposed of in a proper manner.

(1) Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall comply with the provisions of California Code of Regulations, Title 24, Part 9, Section 304.3.

(2) Wastebaskets and linen containers in Group I-2 and I-3 occupancies shall comply with the provisions of California Code of Regulations Title 24, Part 9, Section 808.

(c) Approved self-closing metal containers or listed disposal containers by an approved testing or listing agency shall be provided and maintained in all rooms or locations where oily rags, oily waste, paint rags or similar materials subject to spontaneous ignition are used or are stored temporarily. Such containers shall be emptied daily.

(d) Ashes shall not be placed in, on or near combustible material, but shall be placed in approved metal containers, until removed from the premises or otherwise properly disposed of.

(e) No dry vegetation shall be permitted to exist within 20 feet of any building or occupancies subject to California Code of Regulations, Title 19, Division 1 regulations.

(f) Except when permitted by the enforcing agency, boiler rooms, mechanical rooms, transformer and switchgear vaults and electrical panel rooms, shall not be used for storage.

(g) Electric motors, filters on heating equipment and grease hoods shall be checked periodically and kept clean and maintained in a safe operating condition.

301.2 Permits. Permits shall be required as set forth in Section 105.5 for the activities or uses regulated by Sections 306, 307, 308, 315, 320, 321 and *322*.

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SECTION 302—DEFINITIONS

302.1 Definitions. The following terms are defined in Chapter 2:

3D PRINTER.

ADDITIVE MANUFACTURING.

BONFIRE.

HI-BOY.

HIGH-VOLTAGE TRANSMISSION LINE.

OPEN BURNING.

PORTABLE OUTDOOR FIREPLACE.

POWERED INDUSTRIAL TRUCK.

RECREATIONAL FIRE.

SKY LANTERN.

VALET TRASH COLLECTION.

SECTION 303—ASPHALT KETTLES

303.1 Transporting. Asphalt (tar) kettles shall not be transported over any highway, road or street when the heat source for the kettle is operating.

Exception: Asphalt (tar) kettles in the process of patching road surfaces.

303.2 Location. Asphalt (tar) kettles shall not be located within 20 feet (6096 mm) of any combustible material, combustible building surface or any building opening and within a controlled area identified by the use of traffic cones, barriers or other approved means. Asphalt (tar) kettles and pots shall not be utilized inside or on the roof of a building or structure. Roofing kettles and operating asphalt (tar) kettles shall not block means of egress, gates, roadways or entrances.

303.3 Location of fuel containers. Fuel containers shall be located not less than 10 feet (3048 mm) from the burner.

Exception: Containers properly insulated from heat or flame are allowed to be within 2 feet (610 mm) of the burner.

303.4 Attendant. An operating kettle shall be attended by not less than one employee knowledgeable of the operations and hazards. The employee shall be within 100 feet (30 480 mm) of the kettle and have the kettle within sight. Ladders or similar obstacles shall not form a part of the route between the attendant and the kettle.

303.5 Fire extinguishers. There shall be a portable fire extinguisher complying with Section 906 and with a minimum 40-B:C rating within 25 feet (7620 mm) of each asphalt (tar) kettle during the period such kettle is being utilized. Additionally, there shall be one portable fire extinguisher with a minimum 3-A:40-B:C rating on the roof being covered.

303.6 Lids. Asphalt (tar) kettles shall be equipped with tight-fitting lids.

303.7 Hi-boys. Hi-boys shall be constructed of noncombustible materials. Hi-boys shall be limited to a capacity of 55 gallons (208 L). Fuel sources or heating elements shall not be allowed as part of a hi-boy.

303.8 Roofing kettles. Roofing kettles shall be constructed of noncombustible materials.

303.9 Fuel containers under air pressure. Fuel containers that operate under air pressure shall not exceed 20 gallons (76 L) in capacity and shall be approved.

SECTION 304—COMBUSTIBLE WASTE MATERIAL

304.1 Waste accumulation prohibited. Combustible waste material creating a fire hazard shall not be allowed to accumulate in buildings or structures or upon premises.

[California Code of Regulations, Title 19, Division 1, §3.07(a)] Clearances.

(a) General. No combustible material shall be placed or stored within 10 feet of any building or structure.

304.1.1 Valet trash. Valet trash collection shall be permitted only where approved. The owner and valet trash collection service provider shall comply with the rules and limitations established by the jurisdiction.

304.1.2 Waste material. Accumulations of wastepaper, wood, hay, straw, weeds, litter or combustible or flammable waste or rubbish of any type shall not be permitted to remain on a roof or in any court, yard, vacant lot, alley, parking lot, open space, or beneath a grandstand, bleacher, pier, wharf, manufactured home, recreational vehicle or other similar structure.

304.1.3 Vegetation. Weeds, grass, vines or other growth that is capable of being ignited and endangering property, shall be cut down and removed by the owner or occupant of the premises. Vegetation clearance requirements in wildland-urban interface areas shall be in accordance with *Chapter 49.*

[California Code of Regulations, Title 19, Division 1, §3.07(b)] Clearances.

(b) Ground Clearance. The space surrounding every building or structure shall be maintained in accordance with the following:

Any person that owns, leases, controls, operates or maintains any building or structure in, upon or adjoining any mountainous area or forest-covered lands, brush covered lands or grass-covered lands, or any land which is covered with flammable material, shall at all times do all of the following:

(1) Maintain around and adjacent to such building or structure a firebreak made by removing and clearing away, for a distance of not less than 30 feet on each side thereof or to the property line, whichever is nearer, all flammable vegetation or other combustible growth. This section does not apply to single specimens of trees, ornamental shrubbery or similar plants which are used as ground cover, if they do not form a means of rapidly transmitting fire from the native growth to any building or structure.

(2) Maintain around and adjacent to any such building or structure additional fire protection or firebreak made by removing all bush, flammable vegetation or combustible growth which is located from 30 feet to 100 feet from such building or structure or to the property line, whichever is nearer, as may be required by the enforcing agency if he finds that, because of extra hazardous conditions, a firebreak of only 30 feet around such building or structure is not sufficient to provide reasonable fire safety. Grass and other vegetation located more than 30 feet from such building or structure and less than 18 inches in height above the ground may be maintained where necessary to stabilize the soil and prevent erosion.

(3) Remove that portion of any tree which extends within 10 feet of the outlet of any chimney or stovepipe.

(4) Cut and remove all dead or dying portions of trees located adjacent to or overhanging any building.

(5) Maintain the roof of any structure free of leaves, needles or other dead vegetative growth.

(6) Provide and maintain at all times a screen over the outlet of every chimney or stovepipe that is attached to any fireplace, stove or other device that burns any solid or liquid fuel. The screen shall be constructed of nonflammable material with openings of not more than $^{1}/_{2}$ inch in size.

(7) Vegetation around all applicable buildings and structures shall be maintained in accordance with the following laws and regulations:

(A) Public Resources Code Section 4291.

(B) California Code of Regulations Title 14 - Natural Resources, Division 1.5 - Department of Forestry and Fire Protection, "General Guideline to Create Defensible Space."

(C) California Government Code Section 51182.

(D) California Code of Regulations, Title 24, Part 9.

304.1.4 Space underneath seats. Spaces underneath grandstand and bleacher seats shall be kept free from combustible and flammable materials. Except where enclosed in not less than 1-hour fire-resistance-rated construction in accordance with the *California Building Code*.

304.1.4.1 Spaces underneath grandstands and bleachers. Spaces underneath grandstands and bleachers shall not be occupied or utilized for purposes other than means of egress except where equipped with an automatic sprinkler system in accordance with Section 903.2.1.5.1, or separated with fire barriers and horizontal assemblies in accordance with Section 1030.1.1.1.

304.2 Storage. Storage of combustible rubbish shall not produce conditions that will create a nuisance or a hazard to the public health, safety or welfare.

304.3 Containers. Containers for combustible rubbish and waste material located within or near a structure shall comply with Sections 304.3.1 through 304.3.7.

[California Code of Regulations, Title 19, Division 1, §3.19(b) and (c)] Housekeeping.

Every building or portion of a building governed by California Code of Regulations, Title 19, Division 1 regulations shall be maintained in a neat orderly manner, free from any condition that would create a fire or life hazard or a condition which would add to or contribute to the rapid spread of fire. Provisions shall be made for the proper storage and disposal of waste materials and rubbish consistent with the following:

(b) All combustible waste material and rubbish shall be stored in approved containers or shall be stored in a manner approved by the enforcing agency as being consistent with standard fire prevention practices until such waste material and rubbish is removed from the premises or otherwise disposed of in a proper manner.

(1) Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall comply with the provisions of California Code of Regulations, Title 24, Part 9, Section 304.3.

(2) Wastebaskets and linen containers in Group I-2 and I-3 occupancies shall comply with the provisions of California Code of Regulations Title 24, Part 9, Section 808.

(c) Approved self-closing metal containers or listed disposal containers by an approved testing or listing agency shall be provided and maintained in all rooms or locations where oily rags, oily waste, paint rags or similar materials subject to spontaneous ignition are used or are stored temporarily. Such containers shall be emptied daily.

304.3.1 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container. Contents of such containers shall be removed and disposed of daily.

304.3.2 Low heat release materials. Where required by this section, low heat release materials shall exhibit a peak rate of heat release not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

304.3.3 Capacity exceeding 5.33 cubic feet. Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall be provided with lids. Containers and lids shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2.

304.3.4 Capacity of 1 cubic yard or more. Dumpsters with an individual capacity of 1.0 cubic yard [200 gallons (0.76 m^3)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines unless the dumpsters are constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2.

Exceptions:

1. Dumpsters in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.

304.3.5 Capacity exceeding 1.5 cubic yards. Dumpsters and containers with an individual capacity of 1.5 cubic yards [40.5 cubic feet (1.15 m^3)] or more shall not be stored in buildings or placed within 5 feet (1524 mm) of combustible walls, openings or combustible roof eave lines.

Exceptions:

1. Dumpsters or containers that are placed inside buildings in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
2. Storage in a structure shall not be prohibited where the structure is of Type I or IIA construction, located not less than 10 feet (3048 mm) from other buildings and used exclusively for dumpster or container storage.
3. Dumpsters or containers that are located adjacent to buildings where the exterior area is protected by an approved automatic sprinkler system.

304.3.6 Waste and linen containers in Group I-1, I-2 and I-3 occupancies and ambulatory care facilities. Waste and linen containers located in Group I-1, I-2 and I-3 occupancies and ambulatory care facilities shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable waste and linen containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste and linen collection room and constructed in accordance with Table 509.1 of the *California Building Code*.

Exception: Recycling clean waste containers complying with Section 304.3.6.2 are not required to be stored in waste and linen collection rooms.

304.3.6.1 Capacity density. The average capacity density of containers located in an individual room or space, other than waste and linen collection rooms, shall not be greater than 0.5 gal/ft (20.4 L/m).

304.3.6.2 Recycling clean waste containers. Recycling clean waste containers, including their lids, shall not exceed an individual capacity of 96 gallons (363 L).

304.3.7 Waste containers with a capacity of 20 gallons or more in Group R-2 college and university dormitories. Waste containers, including their lids, located in Group R-2 college and university dormitories, and with a capacity of 20 gallons (75.7 L) or more, shall be constructed of noncombustible materials or low heat release materials in accordance with Section 304.3.2. Metal waste containers with a capacity of 20 gallons (75.7 L) or more shall be listed in accordance with UL 1315 and shall be provided with a noncombustible lid. Portable waste containers exceeding 32 gallons (121 L) shall be stored in an area classified as a waste collection room constructed in accordance with Table 509.1 of the *California Building Code*.

SECTION 305—IGNITION SOURCES

305.1 Clearance from ignition sources. Clearance between ignition sources, such as luminaires, heaters, flame-producing devices and combustible materials, shall be maintained in an approved manner.

305.2 Hot ashes and spontaneous ignition sources. Hot ashes, cinders, smoldering coals or greasy or oily materials subject to spontaneous ignition shall not be deposited in a combustible receptacle, within 10 feet (3048 mm) of other combustible material including combustible walls and partitions or within 2 feet (610 mm) of openings to buildings.

Exception: The minimum required separation distance to other combustible materials shall be 2 feet (610 mm) where the material is deposited in a covered, noncombustible receptacle placed on a noncombustible floor, ground surface or stand.

305.3 Open-flame warning devices. Open-flame warning devices shall not be used along an excavation, road, or any place where the dislodgment of such device might permit the device to roll, fall or slide on to any area or land containing combustible material.

305.4 Deliberate or negligent burning. It shall be unlawful to deliberately or through negligence set fire to or cause the burning of combustible material in such a manner as to endanger the safety of persons or property.

305.5 Unwanted fire ignitions. Acts or processes that have caused repeated ignition of unwanted fires shall be modified to prevent future ignition.

SECTION 306—MOTION PICTURE PROJECTION ROOMS AND FILM

306.1 Motion picture projection rooms. Electric arc, xenon or other light source projection equipment that develops hazardous gases, dust or radiation and the projection of ribbon-type cellulose nitrate film, regardless of *California* light source used in projection, shall be operated within a motion picture projection room complying with Section 409 of the *California Building Code*.

306.2 Cellulose nitrate film storage. Storage of cellulose nitrate film shall be in accordance with NFPA 40.

SECTION 307—OPEN BURNING, RECREATIONAL FIRES AND PORTABLE OUTDOOR FIREPLACES

307.1 General. A person shall not kindle or maintain or authorize to be kindled or maintained any open burning unless conducted and approved in accordance with Sections 307.1.1 through 307.5.

307.1.1 Prohibited open burning. Open burning shall be prohibited when atmospheric conditions or local circumstances make such fires hazardous.

Exception: Prescribed burning for the purpose of reducing the impact of wildland fire when authorized by the fire code official.

307.2 Permit required. A permit shall be obtained from the fire code official in accordance with Section 105.5 prior to kindling a fire for recognized silvicultural or range or wildlife management practices, prevention or control of disease or pests, or a bonfire. Application for such approval shall only be presented by and permits issued to the owner of the land on which the fire is to be kindled.

307.2.1 Authorization. Where required by state or local law or regulations, open burning shall only be permitted with prior approval from the state or local air and water quality management authority, provided that all conditions specified in the authorization are followed.

307.3 Extinguishment authority. Where open burning creates or adds to a hazardous situation, or a required permit for open burning has not been obtained, the fire code official is authorized to order the extinguishment of the open burning operation.

307.4 Location. The location for open burning shall be not less than 50 feet (15 240 mm) from any structure, and provisions shall be made to prevent the fire from spreading to within 50 feet (15 240 mm) of any structure.

Exceptions:

1. Fires in approved containers that are not less than 15 feet (4572 mm) from a structure.
2. The minimum required distance from a structure shall be 25 feet (7620 mm) where the pile size is 3 feet (914 mm) or less in diameter and 2 feet (610 mm) or less in height.

307.4.1 Bonfires. A bonfire shall not be conducted within 50 feet (15 240 mm) of a structure or combustible material unless the fire is contained in a barbecue pit. Conditions that could cause a fire to spread within 50 feet (15 240 mm) of a structure shall be eliminated prior to ignition.

307.4.2 Recreational fires. Recreational fires shall not be conducted within 25 feet (7620 mm) of a structure or combustible material. Conditions that could cause a fire to spread within 25 feet (7620 mm) of a structure shall be eliminated prior to ignition.

307.4.3 Portable outdoor fireplaces. Portable outdoor fireplaces shall be used in accordance with the manufacturer's instructions and shall not be operated within 15 feet (3048 mm) of a structure or combustible material.

Exception: Portable outdoor fireplaces used at one- and two-family dwellings.

307.5 Attendance. Open burning, bonfires, recreational fires and use of portable outdoor fireplaces shall be constantly attended until the fire is extinguished. Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other approved on-site fire-extinguishing equipment, such as dirt, sand, water barrel, garden hose or water truck, shall be available for immediate utilization.

SECTION 308—OPEN FLAMES

308.1 General. Open flame, fire and burning on all premises shall be in accordance 0with Sections 308.1.1 through 308.4.1 and with other applicable sections of this code.

308.1.1 Where prohibited. A person shall not take or utilize an open flame or light in a structure, vessel, boat or other place where highly flammable, combustible or explosive material is utilized or stored. Lighting appliances shall be well-secured in a glass globe and wire mesh cage or a similar approved device.

[California Code of Regulations, Title 19, Division 1, §3.25(a) and (b)] Open Flame Devices.

(a) Open flame devices shall be prohibited in every Group A, E, I, R-2.1, R-3.1 and R-4 Occupancy.

Exceptions:

(1) Fuel burning elements of approved appliances shall not be considered as open flame devices.

(2) Upon approval of the enforcing agency, open flame devices may be used under the following conditions.

(A) When necessary for ceremonial or theatrical purposes under such restrictions as may be deemed necessary to avoid danger of ignition of combustible materials or injury to occupants.

(B) In approved and stable candle holders on individual tables of dining establishments.

(b) Under no circumstances shall hand held open flame devices such as exposed candles be permitted for any purpose in any occupancy within the scope of California Code of Regulations, Title 19, Division 1 regulations.

308.1.2 Throwing or placing sources of ignition. A person shall not throw or place, or cause to be thrown or placed, a lighted match, cigar, cigarette, matches, or other flaming or glowing substance or object on any surface or article where it can cause an unwanted fire.

308.1.3 Torches for removing paint. A person utilizing a torch or other flame-producing device for removing paint from a structure shall provide not less than one portable fire extinguisher complying with Section 906 and with a minimum 4-A rating, two portable fire extinguishers, each with a minimum 2-A rating, or a water hose connected to the water supply on the premises where such burning is done. The person doing the burning shall remain on the premises 1 hour after the torch or flame-producing device is utilized.

* **308.1.4 Location near combustibles.** Open flames such as from candles and lanterns shall not be located on or near decorative material or similar combustible materials.

308.1.5 Open-flame devices in wildfire risk areas. Torches and other devices, machines or processes liable to start or cause fire shall not be operated or used in or on wildfire risk areas, except by a permit in accordance with Section 105.5 secured from the fire code official.

Exception: Use within inhabited premises or designated campsites that are not less than 30 feet (9144 mm) from grass-, grain-, brush- or forest-covered areas.

308.1.5.1 Signals and markers. Flame-employing devices, such as lanterns or kerosene road flares, shall not be operated or used as a signal or marker in or on wildfire risk areas.

Exception: The proper use of fusees at the scenes of emergencies or as required by standard railroad operating procedures.

308.1.6 Portable fueled open-flame devices. Portable open-flame devices fueled by flammable or combustible gases or liquids shall be enclosed or installed in such a manner as to prevent the flame from contacting combustible material.

Exceptions:

1. LP-gas-fueled devices used for sweating pipe joints or removing paint in accordance with Chapter 61.
2. Cutting and welding operations in accordance with Chapter 35.
3. Torches or flame-producing devices in accordance with Section 308.4.
4. Candles and open-flame decorative devices in accordance with Section 308.3.

308.1.7 Sky lanterns. A person shall not release or cause to be released an untethered sky lantern.

308.1.8 Religious ceremonies. Where, in the opinion of the fire code official, adequate safeguards have been taken, participants in religious ceremonies are allowed to carry hand-held candles. Hand-held candles shall not be passed from one person to another while lighted.

308.1.9 Aisles and exits. Candles shall be prohibited in areas where occupants stand, or in an aisle or exit.

308.1.10 Flaming food and beverage preparation. The preparation of flaming foods or beverages in places of assembly and drinking or dining establishments shall be in accordance with Sections 308.1.10.1 through 308.1.10.5.

308.1.10.1 Dispensing. Flammable or combustible liquids used in the preparation of flaming foods or beverages shall be dispensed from one of the following:

1. A 1-ounce (29.6 ml) container.
2. A container not exceeding 1-quart (946.5 ml) capacity with a controlled pouring device that will limit the flow to a 1-ounce (29.6 ml) serving.

308.1.10.2 Containers not in use. Containers shall be secured to prevent spillage when not in use.

308.1.10.3 Serving of flaming food. The serving of flaming foods or beverages shall be done in a safe manner and shall not create high flames. The pouring, ladling or spooning of liquids is restricted to a maximum height of 8 inches (203 mm) above the receiving receptacle.

308.1.10.4 Location. Flaming foods or beverages shall be prepared only in the immediate vicinity of the table being serviced. They shall not be transported or carried while burning.

308.1.10.5 Fire protection. The person preparing the flaming foods or beverages shall have a wet cloth towel immediately available for use in smothering the flames in the event of an emergency.

308.2 Permits required. Permits shall be obtained from the fire code official in accordance with Section 105.5 prior to engaging in the following activities involving open flame, fire and burning:

1. Use of a torch or flame-producing device to remove paint from a structure.
2. Use of open flame, fire or burning in connection with Group A or E occupancies.
3. Use or operation of torches and other devices, machines or processes liable to start or cause fire in or on wildfire risk areas.

308.3 Group A occupancies. Open-flame devices shall not be used in a Group A occupancy.

Exceptions:

1. Open-flame devices are allowed to be used in the following situations, provided that approved precautions are taken to prevent ignition of a combustible material or injury to occupants:
   1.1. Where necessary for ceremonial or religious purposes in accordance with Section 308.1.8.

1.2. On stages and platforms as a necessary part of a performance in accordance with Section 308.3.2.

1.3. Where candles on tables are securely supported on substantial noncombustible bases and the candle flames are protected.

2. Heat-producing equipment complying with Chapter 6 and the *California Mechanical Code*.

3. Gas lights are allowed to be used provided that adequate precautions satisfactory to the fire code official are taken to prevent ignition of combustible materials.

308.3.1 Open-flame decorative devices. Open-flame decorative devices shall comply with all of the following restrictions:

1. Class I and Class II liquids and LP-gas shall not be used.
2. Liquid- or solid-fueled lighting devices containing more than 8 ounces (237 ml) of fuel must self-extinguish and not leak fuel at a rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
3. The device or holder shall be constructed to prevent the spillage of liquid fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) when the device or holder is not in an upright position.
4. The device or holder shall be designed so that it will return to the upright position after being tilted to an angle of 45 degrees (0.79 rad) from vertical.

   Exception: Devices that self-extinguish if tipped over and do not spill fuel or wax at the rate of more than 0.25 teaspoon per minute (1.26 ml per minute) if tipped over.
5. The flame shall be enclosed except where openings on the side are not more than 0.375-inch (9.5 mm) diameter or where openings are on the top and the distance to the top is such that a piece of tissue paper placed on the top will not ignite in 10 seconds.
6. Chimneys shall be made of noncombustible materials and securely attached to the open-flame device.

   Exception: A chimney is not required to be attached to any open-flame device that will self-extinguish if the device is tipped over.
7. Fuel canisters shall be safely sealed for storage.
8. Storage and handling of combustible liquids shall be in accordance with Chapter 57.
9. Shades, where used, shall be made of noncombustible materials and securely attached to the open-flame device holder or chimney.
10. Candelabras with flame-lighted candles shall be securely fastened in place to prevent overturning, and shall be located away from occupants using the area and away from possible contact with drapes, curtains or other combustibles.

308.3.2 Theatrical performances. Where approved, open-flame devices used in conjunction with theatrical performances are allowed to be used where adequate safety precautions have been taken in accordance with NFPA 160.

308.4 Group R occupancies. Open flame, fire and burning in Group R occupancies shall comply with the requirements of Sections 308.1 through 308.1.7 and Section 308.4.1.

308.4.1 Group R-2 dormitories. Candles, incense and similar open-flame-producing items shall not be allowed in sleeping units in Group R-2 dormitory occupancies.

308.5 Group I, R-2.1, R-3.1, R-4 occupancies or any Licensed Care Facility. *A person shall not utilize or allow to be utilized, an open flame in Group I, R-2.1, R-3.1, R-4 occupancies or any Licensed Care Facilities.*

SECTION 309—POWERED INDUSTRIAL TRUCKS AND EQUIPMENT

309.1 General. Powered industrial trucks and similar equipment including, but not limited to, floor scrubbers and floor buffers, shall be operated and maintained in accordance with Sections 309.2 through 309.7.

309.2 Use in hazardous (classified) locations. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with *the California Electrical Code* shall be listed and labeled for use in the environment intended in accordance with NFPA 505.

309.3 Battery chargers. Battery chargers shall be of an approved type. Combustible storage shall be kept not less than 3 feet (915 mm) from battery chargers. Battery charging shall not be conducted in areas open to the public.

309.4 Ventilation. Ventilation shall be provided in an approved manner in battery-charging areas to prevent a dangerous accumulation of flammable gases.

309.5 Fire extinguishers. Battery-charging areas shall be provided with a fire extinguisher complying with Section 906 having a minimum 4-A:20-B:C rating within 20 feet (6096 mm) of the battery charger.

309.6 Refueling. Powered industrial trucks using liquid fuel, LP-gas or hydrogen shall be refueled outside of buildings or in areas specifically approved for that purpose. Fixed fuel-dispensing equipment and associated fueling operations shall be in accordance with Chapter 23. Other fuel-dispensing equipment and operations, including cylinder exchange for LP-gas-fueled vehicles, shall be in accordance with Chapter 57 for flammable and combustible liquids or Chapter 61 for LP-gas.

309.7 Repairs. Repairs to fuel systems, electrical systems and repairs utilizing open flame or welding shall be done in approved locations outside of buildings or in areas specifically approved for that purpose.

SECTION 310—SMOKING

310.1 General. The smoking or carrying of a lighted pipe, cigar, cigarette or any other type of smoking paraphernalia or material is prohibited in the areas indicated in Sections 310.2 through 310.8.

310.2 Prohibited areas. Smoking shall be prohibited where conditions are such as to make smoking a hazard, and in spaces where flammable or combustible materials are stored or handled.

Exception: In Group I-2 occupancies, patients shall be permitted to smoke in designated patient care areas based on the clinical needs of the patient.

[California Code of Regulations, Title 19, Division 1, §3.32(a) and (b)] Smoking.

(a) Smoking shall not be permitted in any Group E Occupancy as defined in California Code of Regulations, Title 24, Part 2, except as provided in California Code of Regulations, Title 19, Division 1, subsection (b), below.

(b) The governing board of any school district maintaining a community college or high school may adopt rules and regulations permitting the smoking and possession of tobacco on the campus of a community college or high school or while under the authority of school personnel by pupils of the community college or high school; provided that such rules and regulations shall not permit students to smoke in any classroom or other enclosed facility which any student is required to occupy or which is customarily occupied by nonsmoking students. Areas designated for smoking shall be approved by the enforcing agency.

***NOTE:** See Section 48901 of the Education Code relating to the smoking or possession of tobacco by pupils.*

[California Code of Regulations, Title 19, Division 1, §3.32(d)] Smoking.

(d) Smoking shall be prohibited in any patient room of a Group I, R-2.1, R-3.1 or R-4 occupancy utilizing air-induced mattresses. "No Smoking – Open Flame" signs shall be installed as specified in NFPA 99B, Hypobaric Facilities, 2005 edition.

310.2.1 Group I-2. In Group I-2 occupancies, smoking shall be prohibited in patient care areas or where oxygen is used, stored or handled.

310.3 "No Smoking" signs. The fire code official is authorized to order the posting of "No Smoking" signs or the international symbol for no smoking in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and location of required "No Smoking" signs shall be approved.

Exception: "No Smoking" signs are not required in interior locations of the facility where signs are displayed at all major entrances into the facility.

[California Code of Regulations, Title 19, Division 1, §3.32(c)] Smoking.

(c) Approved no smoking signs shall be posted on all stages and platforms of Group A occupancies. Smoking shall not be permitted on stages or platforms except in approved designated areas and as necessary for theatrical, opera or similar productions.

310.4 Removal of signs prohibited. A posted "No Smoking" sign shall not be obscured, removed, defaced, mutilated or destroyed.

310.5 Compliance with "No Smoking" signs. Smoking shall not be permitted nor shall a person smoke, throw or deposit any lighted or smoldering substance in any place where "No Smoking" signs are posted.

310.6 Ash trays. Where smoking is permitted, suitable noncombustible ash trays or match receivers shall be provided on each table and at other appropriate locations. In Group I-2 occupancies, noncombustible metal containers with self-closing covers shall be provided in areas where smoking is permitted.

310.7 Burning objects. Lighted matches, cigarettes, cigars or other burning object shall not be discarded in such a manner that could cause ignition of other combustible material.

310.8 Hazardous environmental conditions. Where the fire code official determines that hazardous environmental conditions necessitate controlled use of smoking materials, the ignition or use of such materials in mountainous, brush-covered or forest-covered areas or other designated areas is prohibited except in approved designated smoking areas.

SECTION 311—VACANT PREMISES

311.1 General. Temporarily unoccupied buildings, structures, premises or portions thereof, including tenant spaces, shall be safeguarded and maintained in accordance with Sections 311.1.1 through 311.6.

311.1.1 Abandoned premises. Buildings, structures and premises for which an owner cannot be identified or located by dispatch of a certificate of mailing to the last known or registered address, which persistently or repeatedly become unprotected or unsecured, which have been occupied by unauthorized persons or for illegal purposes, or which present a danger of structural collapse or fire spread to adjacent properties shall be considered to be abandoned, declared unsafe and abated by demolition or rehabilitation in accordance with the *International Property Maintenance Code* and the *California Building Code*.

311.1.2 Tenant spaces. Storage and lease plans required by this code shall be revised and updated to reflect temporary or partial vacancies.

311.2 Safeguarding vacant premises. Temporarily unoccupied buildings, structures, premises or portions thereof shall be secured and protected in accordance with Sections 311.2.1 through 311.2.3.

311.2.1 Security. Exterior and interior openings open to other tenants or unauthorized persons shall be boarded, locked, blocked or otherwise protected to prevent entry by unauthorized individuals. The fire code official is authorized to placard, post signs, erect barrier tape or take similar measures as necessary to secure public safety.

311.2.2 Fire protection. Fire protection systems shall be maintained in an operable condition at all times.

Exceptions:

1. Where the premises have been cleared of all combustible materials and debris and, in the opinion of the fire code official, the type of construction, fire separation distance and security of the premises do not create a fire hazard.
2. Where approved by the fire code official, buildings that will not be heated and where fire protection systems will be exposed to freezing temperatures, fire alarm and automatic sprinkler systems are permitted to be placed out of service and standpipes are permitted to be maintained as dry systems (without an automatic water supply), provided that the building does not have contents or storage, and windows, doors and other openings are secured to prohibit entry by unauthorized persons.
3. Where approved by the fire code official, fire alarm and automatic sprinkler systems are permitted to be placed out of service in seasonally occupied buildings: that will not be heated; where fire protection systems will be exposed to freezing temperatures; where fire areas do not exceed 12,000 square feet (1115 m^2); and that do not store motor vehicles or hazardous materials.

311.2.3 Fire separation. Fire-resistance-rated partitions, fire barriers and fire walls separating vacant tenant spaces from the remainder of the building shall be maintained. Openings, joints and penetrations in fire-resistance-rated assemblies shall be protected in accordance with Chapter 7.

311.3 Removal of combustibles. Persons owning, or in charge or control of, a vacant building or portion thereof, shall remove therefrom all accumulations of combustible materials, flammable or combustible waste or rubbish and shall securely lock or otherwise secure doors, windows and other openings to prevent entry by unauthorized persons. The premises shall be maintained clear of waste or hazardous materials.

Exceptions:

1. Buildings or portions of buildings undergoing additions, alterations, repairs or change of occupancy in accordance with the *California Building Code*, where waste is controlled and removed as required by Section 304.
2. Seasonally occupied buildings.

311.4 Removal of hazardous materials. Persons owning or having charge or control of a vacant building containing hazardous materials regulated by Chapter 50 shall comply with the facility closure requirements of Section 5001.6.

311.5 Placards. Any vacant or abandoned buildings or structures determined to be unsafe pursuant to Section 111 relating to structural or interior hazards shall be marked as required by Sections 311.5.1 through 311.5.5.

311.5.1 Placard location. Placards shall be applied on the front of the structure and be visible from the street. Additional placards shall be applied to the side of each entrance to the structure and on penthouses.

311.5.2 Placard size and color. Placards shall be 24 inches by 24 inches (610 mm by 610 mm) minimum in size with a red background, white reflective stripes and a white reflective border. The stripes and border shall have a 2-inch (51 mm) minimum stroke.

311.5.3 Placard date. Placards shall bear the date of their application to the building and the date of the most recent inspection.

311.5.4 Placard symbols. The design of the placards shall use the following symbols:

1. ☐ This symbol shall mean that the structure had normal structural conditions at the time of marking.
2. ⧅ This symbol shall mean that structural or interior hazards exist and interior firefighting or rescue operations should be conducted with extreme caution.
3. ☒ This symbol shall mean that structural or interior hazards exist to a degree that consideration should be given to limit firefighting to exterior operations only, with entry only occurring for known life hazards.
4. Vacant marker hazard identification symbols: The following symbols shall be used to designate known hazards on the vacant building marker. They shall be placed directly above the symbol.
    4.1. R/O—Roof open.
    4.2. S/M—Stairs, steps and landing missing.
    4.3. F/E—Avoid fire escapes.
    4.4. H/F—Holes in floor.

311.5.5 Informational use. The use of these symbols shall be informational only and shall not in any way limit the discretion of the on-scene incident commander.

311.6 Unoccupied tenant spaces in mall buildings. Unoccupied tenant spaces in covered and open mall buildings shall be:

1. Kept free from the storage of any materials.
2. Separated from the remainder of the building by partitions of not less than 0.5-inch-thick (12.7 mm) gypsum board or an approved equivalent to the underside of the ceiling of the adjoining tenant spaces.
3. Without doors or other access openings other than one door that shall be kept key locked in the closed position except during that time when opened for inspection.
4. Kept free from combustible waste and be broomswept clean.

SECTION 312—VEHICLE IMPACT PROTECTION

312.1 General. Vehicle impact protection required by this code shall be provided by posts that comply with Section 312.2 or by other approved physical barriers that comply with Section 312.3.

312.2 Posts. Guard posts shall comply with all of the following requirements:

1. Constructed of steel not less than 4 inches (102 mm) in diameter and concrete filled.
2. Spaced not more than 4 feet (1219 mm) between posts on center.
3. Set not less than 3 feet (914 mm) deep in a concrete footing of not less than a 15-inch (381 mm) diameter.
4. Set with the top of the posts not less than 3 feet (914 mm) above ground.
5. Located not less than 3 feet (914 mm) from the protected object.

312.3 Other barriers. Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where approved.

SECTION 313—FUELED EQUIPMENT

313.1 General. Fueled equipment including, but not limited to, motorcycles, mopeds, lawn-care equipment and portable generators shall not be stored, operated or repaired within a building.

Exceptions:

1. Buildings or rooms constructed for such use in accordance with the *California Building Code*.
2. Where allowed by Section 314.
3. Storage of equipment utilized for maintenance purposes is allowed in approved locations where the aggregate fuel capacity of the stored equipment does not exceed 10 gallons (38 L) and the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

313.1.1 Removal. The fire code official is authorized to require removal of fueled equipment from locations where the presence of such equipment is determined by the fire code official to be hazardous.

313.2 Group R occupancies. Vehicles powered by flammable liquids, Class II combustible liquids or compressed flammable gases shall not be stored within the living space of Group R buildings.

SECTION 314—INDOOR DISPLAYS

314.1 General. Indoor displays constructed within any occupancy shall comply with Sections 314.2 through 314.4.

314.2 Fixtures and displays. Fixtures and displays of goods for sale to the public shall be arranged so as to maintain free, immediate and unobstructed access to exits as required by Chapter 10.

314.3 Highly combustible goods. The display of highly combustible goods, including but not limited to fireworks, flammable or combustible liquids, liquefied flammable gases, oxidizing materials, pyroxylin plastics and agricultural goods, in main exit access aisles, corridors, covered and open malls, or within 5 feet (1524 mm) of entrances to exits and exterior exit doors is prohibited where a fire involving such goods would rapidly prevent or obstruct egress.

314.4 Vehicles. Liquid-fueled or gaseous-fueled vehicles, aircraft, boats or other motorcraft shall not be located indoors except as follows:

1. The engine starting system is made inoperable or ignition batteries are disconnected except where the fire code official requires that the batteries remain connected to maintain safety features.
2. Fuel in fuel tanks does not exceed any of the following:
   - 2.1. Class I, II and III liquid fuel does not exceed one-quarter tank or 5 gallons (19 L), whichever is less.
   - 2.2. LP gas does not exceed one-quarter tank or 6.6 gallons (25 L), whichever is less.
   - 2.3. CNG does not exceed one-quarter tank or 630 cubic feet (17.8 m^3), whichever is less.
   - 2.4. Hydrogen does not exceed one-quarter tank or 2,000 cubic feet (57 m^3), whichever is less.
3. Fuel tanks and fill openings are closed and sealed to prevent tampering.
4. Vehicles, aircraft, boats or other motorcraft equipment are not fueled or defueled within the building.

SECTION 315—GENERAL STORAGE

315.1 General. Storage shall be in accordance with Sections 315.2 through 315.6. Outdoor pallet storage shall be in accordance with Sections 315.2 and 315.7.

Exception: Wood and wood composite pallets stored outdoors at pallet manufacturing and recycling facilities and complying with Section 2810.

315.2 Permit required. A permit for miscellaneous combustible storage shall be required as set forth in Section 105.5.

315.3 Storage in buildings. Storage of materials in buildings shall be orderly and stacks shall be stable. Storage of combustible materials shall be separated from heaters or heating devices by distance or shielding so that ignition cannot occur.

315.3.1 Ceiling clearance. Storage shall be maintained 2 feet (610 mm) or more below the ceiling in nonsprinklered areas of buildings or not less than 18 inches (457 mm) below sprinkler deflectors in sprinklered areas of buildings.

Exceptions:

1. The 2-foot (610 mm) ceiling clearance is not required for storage along walls in nonsprinklered areas of buildings.
2. The 18-inch (457 mm) ceiling clearance is not required for storage along walls in areas of buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

315.3.2 Means of egress. Combustible materials shall not be stored in exits or enclosures for stairways and ramps. Combustible materials in the means of egress during construction, demolition, remodeling or alterations shall comply with Section 3310.1.

315.3.3 Equipment rooms. Combustible material shall not be stored in boiler rooms, mechanical rooms, elevator machine rooms, electrical equipment rooms or in fire command centers as specified in Section 508.1.5.

315.3.4 Attic, under-floor and concealed spaces. Attic, under-floor and concealed spaces used for storage of combustible materials shall be protected on the storage side as required for 1-hour fire-resistance-rated construction. Openings shall be protected by assemblies that are self-closing and are of noncombustible construction or solid wood core not less than $1^3/_4$ inches (44.5 mm) in thickness. Storage shall not be placed on exposed joists.

Exceptions:

1. Areas protected by approved automatic sprinkler systems.
2. Group R-3 and Group U occupancies.

315.4 Outside storage. Outside storage of combustible materials shall not be located within 10 feet (3048 mm) of a lot line.

Exceptions:

1. The separation distance is allowed to be reduced to 3 feet (914 mm) for storage not exceeding 6 feet (1829 mm) in height.
2. The separation distance is allowed to be reduced where the fire code official determines that hazard to the adjoining property does not exist.

315.4.1 Storage beneath overhead projections from buildings. Where buildings are protected by an automatic sprinkler system, the outdoor storage, display and handling of combustible materials under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

315.4.2 Height. Storage in the open shall not exceed 20 feet (6096 mm) in height.

315.5 Storage underneath high-voltage transmission lines. Storage located underneath high-voltage transmission lines shall be in accordance with Section 316.6.2.

315.6 Storage in plenums. Storage is prohibited in plenums. Abandoned material in plenums shall be deemed to be storage and shall be removed. Where located in plenums, the portion of abandoned cables that are able to be accessed without causing damage, or requiring demolition to the building shall be identified for future use with a tag or shall be deemed storage and shall be removed.

315.7 Outdoor pallet storage. Pallets stored outdoors shall comply with Sections 315.7 through 315.7.7. Pallets stored within a building shall be protected in accordance with Chapter 32.

315.7.1 Storage beneath overhead projections from buildings. Where buildings are equipped throughout with an automatic sprinkler system, the outdoor storage of pallets under eaves, canopies or other projections or overhangs are prohibited except where automatic sprinklers are installed under such eaves, canopies or other projections or overhangs.

315.7.2 Distance to lot line. Pallet storage shall not be located within 10 feet (3048 mm) of a lot line.

315.7.3 Storage height. Pallet storage shall not exceed 20 feet (6096 mm) in height.

315.7.4 Pallet pile stability and size. Pallet stacks shall be arranged to form stable piles. Individual pallet piles shall cover an area not greater than 400 square feet (37 m^2).

315.7.5 Pallet types. Pallets shall be all wood, with slatted or solid top or bottom, with metal fasteners, or shall be plastic or composite pallets, listed and labeled in accordance with UL 2335 or FM 4996. Plastic pallets shall be both solid and gridded deck, independent of the pallet manufacturing process, type of resin used in fabrication or geometry of the pallet.

315.7.6 Pile separation distances. In addition to the other requirements of this section, pallet stacks and piles shall be separated in accordance with Sections 315.7.6.1 and 315.7.6.2.

TABLE 315.7.6(1)—SEPARATION DISTANCE BETWEEN WOOD PALLET STACKS AND BUILDINGS

WALL CONSTRUCTION	OPENING TYPE	WOOD PALLET SEPARATION DISTANCE (feet)		
		≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Masonry	None	2	2	2
Masonry	Fire-rated glazing with open sprinklers	2	5	20
Masonry	Fire-rated glazing	5	10	20
Masonry	Plain glass with open sprinklers	5	10	20
Noncombustible	None	5	10	20

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TABLE 315.7.6(1)—SEPARATION DISTANCE BETWEEN WOOD PALLET STACKS AND BUILDINGS—continued				
WALL CONSTRUCTION	OPENING TYPE	WOOD PALLET SEPARATION DISTANCE (feet)		
		≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Wood with open sprinklers	—	5	10	20
Wood	None	15	30	90
Any	Plain glass	15	30	90
For SI: 1 foot = 304.8 mm.				

TABLE 315.7.6(2)—SEPARATION DISTANCE BETWEEN PLASTIC PALLET STACKS AND BUILDINGS				
WALL CONSTRUCTION	OPENING TYPE	PLASTIC PALLET SEPARATION DISTANCE (feet)		
		≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Masonry	None	2	2	2
Masonry	Fire-rated glazing with open sprinklers	10	20	50
Masonry	Fire-rated glazing	15	40	100
Masonry	Plain glass with open sprinklers	15	40	100
Noncombustible	None	15	40	100
Wood with open sprinklers	—	15	40	100
Wood	None	30	80	150
Any	Plain glass	30	80	150
For SI: 1 foot = 304.8 mm.				

TABLE 315.7.6(3)—SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (WOOD PALLETS)			
	WOOD PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Between pallet piles	7.5	15	45
Other on-site storage	7.5	15	45
For SI: 1 foot = 304.8 mm.			

TABLE 315.7.6(4)—SEPARATION FROM OTHER PALLET PILES AND ON-SITE STORAGE (PLASTIC PALLETS)			
	PLASTIC PALLET SEPARATION DISTANCE (feet)		
	≤ 50 Pallets	51 to 200 Pallets	> 200 Pallets
Between pallet piles	15	40	75
Other on-site storage	15	40	75
For SI: 1 foot = 304.8 mm.			

315.7.6.1 Building separation. Pallet stacks and piles shall be separated from buildings in accordance with Table 315.7.6(1) for wood pallets and Table 315.7.6(2) for plastic pallets.

315.7.6.2 Separation from other pallets and on-site storage. Pallets shall be separated from other pallet piles and other storage in accordance with Table 315.7.6(3) for wood pallets and Table 315.7.6(4) for plastic pallets.

315.7.7 Prohibited locations. Pallets shall not be stored underneath high-voltage transmission lines, elevated roadways or elevated railways.

SECTION 316—HAZARDS TO FIREFIGHTERS

316.1 Trapdoors to be closed. Trapdoors and scuttle covers, other than those that are within a dwelling unit or automatically operated, shall be kept closed at all times except when in use.

316.2 Shaftway markings. Vertical shafts shall be identified as required by this section.

316.2.1 Exterior access to shaftways. Outside openings that can be reached by the fire department and that open directly on a hoistway or shaftway communicating between two or more floors in a building shall be plainly marked with the word “SHAFT-

WAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible from the outside of the building.

316.2.2 Interior access to shaftways. Door or window openings to a hoistway or shaftway from the interior of the building shall be plainly marked with the word "SHAFTWAY" in red letters not less than 6 inches (152 mm) high on a white background. Such warning signs shall be placed so as to be readily discernible.

Exception: Marking shall not be required on shaftway openings that are readily discernible as openings onto a shaftway by the construction or arrangement.

316.3 Pitfalls. The intentional design or alteration of buildings to disable, injure, maim or kill intruders is prohibited. A person shall not install and use firearms, sharp or pointed objects, razor wire, explosives, flammable or combustible liquid containers, or dispensers containing highly toxic, toxic, irritant or other hazardous materials in a manner that could passively or actively disable, injure, maim or kill a firefighter who forcibly enters a building for the purpose of controlling or extinguishing a fire, rescuing trapped occupants or rendering other emergency assistance.

316.4 Obstructions on roofs. Wires, cables, ropes, antennas, or other suspended obstructions installed on the roof of a building having a roof slope of less than 30 degrees (0.52 rad) shall not create an obstruction that is less than 7 feet (2133 mm) high above the surface of the roof.

Exceptions:

1. Such obstruction shall be permitted where the wire, cable, rope, antenna or suspended obstruction is encased in a white, 2-inch (51 mm) minimum diameter plastic pipe or an approved equivalent.
2. Such obstruction shall be permitted where there is a solid obstruction below such that accidentally walking into the wire, cable, rope, antenna or suspended obstruction is not possible.

[California Code of Regulations, Title 19, Division 1, §3.05(b)] Fire Department Access and Egress. (Roofs).

(b) Roofs. No person shall install or maintain any security barrier such as barbed wire fencing, razor wire fencing, chain link fencing or any other fencing material, cable, aerial, antenna or other obstruction on the roof of any commercial establishment in such a manner as to obstruct or render egress or access hazardous in the event of fire or other emergency.

***Exception:** Guy wire, rods and aerial antenna masts may be attached to a roof structure having a slope of less than 30 degrees provided there is full clearance of seven feet or more between the roof and said obstruction. Guy wire or rods required to support aerial or antenna masts may be attached to a roof structure a lateral distance from the mast not in excess of one-sixth the height of the mast.*

316.5 Security device. Any security device or system that emits any medium that could obscure a means of egress in any building, structure or premise shall be prohibited.

316.6 Structures and outdoor storage underneath high-voltage transmission lines. Structures and outdoor storage underneath high-voltage transmission lines shall comply with Sections 316.6.1 and 316.6.2, respectively.

316.6.1 Structures. Structures shall not be constructed within the utility easement beneath high-voltage transmission lines.

Exception: Restrooms and unoccupied telecommunication structures of noncombustible construction less than 15 feet (4572 mm) in height.

316.6.2 Outdoor storage. Outdoor storage within the utility easement underneath high-voltage transmission lines shall be limited to noncombustible material. Storage of hazardous materials including, but not limited to, flammable and combustible liquids is prohibited.

Exception: Combustible storage, including vehicles and fuel storage for backup power equipment serving public utility equipment, is allowed, provided that a plan indicating the storage configuration is submitted and approved.

SECTION 317—VEGETATIVE AND LANDSCAPED ROOFS

317.1 General..Vegetative roofs and landscaped roofs shall comply with Sections 1505 and 1507.15 of the *California Building Code* and be installed and maintained in accordance with Sections 317.2 through 317.4.

317.2 Vegetation. Vegetation shall be maintained in accordance with Sections 317.2.1 and 317.2.2.

317.2.1 Irrigation. Supplemental irrigation shall be provided to maintain levels of hydration necessary to keep green roof plants alive and to keep dry foliage to a minimum.

317.2.2 Dead foliage. Excess biomass, such as overgrown vegetation, leaves and other dead and decaying material, shall be removed at regular intervals not less than two times per year.

317.3 Maintenance plan. The fire code official is authorized to require a maintenance plan for vegetation placed on roofs due to the size of a vegetative roof or landscaped roof area, materials used or where a fire hazard exists to the building or exposures due to the lack of maintenance.

317.4 Maintenance equipment. Fueled equipment stored on roofs and used for the care and maintenance of vegetation on roofs shall be stored in accordance with Section 313.

SECTION 318—LAUNDRY CARTS

318.1 Laundry carts with a capacity of 1 cubic yard or more. Laundry carts with an individual capacity of 1 cubic yard [200 gallons (0.76 m^3)] or more, used in laundries within Group B, E, F-1, I, M and R-1 occupancies, shall be constructed of noncombustible materi-

als or materials having a peak rate of heat release not exceeding 300 kW/m^2 at a flux of 50 kW/m^2 where tested in a horizontal orientation in accordance with ASTM E1354.

Exceptions:

1. Laundry carts in areas protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1.
2. Laundry carts in coin-operated laundries.

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SECTION 319—ADDITIVE MANUFACTURING (3D PRINTING)

319.1 General. Additive manufacturing equipment and operations shall comply with Section 319.

319.1.1 Scope. Additive manufacturing shall comply with one of the following:

1. Nonindustrial additive manufacturing shall comply with Section 319.2.
2. Industrial additive manufacturing shall comply with Section 319.3.

319.1.2 Installation, operation and maintenance. 3D printers and associated additive manufacturing equipment shall be installed, operated and maintained in accordance with this code, the listing and the manufacturer's instructions.

319.1.3 Production materials. Only the production materials listed for use with the equipment and included in the manufacturer's instructions shall be used.

319.2 Nonindustrial additive manufacturing. Nonindustrial additive manufacturing equipment and operations shall comply with Sections 319.2.1 and 319.2.2. Additive manufacturing equipment and operations that do not comply with Section 319.2 shall comply with Section 319.3.

319.2.1 Listing. 3D printers used in nonindustrial additive manufacturing shall be listed and labeled in accordance with UL 2011, UL 60950-1 or UL 62368-1. The listing shall also verify:

1. The 3D printers are self-contained and utilize maximum 30-liter prepackaged production materials.
2. The operation of the 3D printers shall not create a hazardous (classified) electrical area or zone outside the unit.
3. If any hazardous (classified) electrical area or zone exists inside the unit's outer enclosure, the area shall be protected by intrinsically safe electrical construction or other acceptable protection methods.
4. The 3D printers shall not utilize inert gas or an external combustible dust collection system.

319.2.2 Occupancies. Nonindustrial additive manufacturing shall be permitted in all occupancy groups.

319.3 Industrial additive manufacturing. Industrial additive manufacturing equipment and operations shall comply with Sections 319.3.1 through 319.3.12.

319.3.1 Permits required. Permits shall be obtained from the fire code official in accordance with Section 105.5 prior to engaging in industrial additive manufacturing operations.

319.3.2 Listing. 3D printers used in industrial additive manufacturing shall be listed and labeled in accordance with UL 2011 or approved for the application based on a field evaluation conducted by an approved agency.

319.3.3 Combustible dusts and metals. Industrial additive manufacturing operations that store, use or produce combustible dust, combustible particulate solids or combustible metals shall comply with Chapter 22 and this section.

319.3.4 Powder evaluation. Printing powders used in industrial additive manufacturing operations shall be tested for combustibility in accordance with NFPA 484 or NFPA 652 as applicable. A copy of test reports shall be provided to the fire code official upon request.

319.3.5 Combustible (nonmetallic) dusts. Industrial additive manufacturing operations that store, use or produce combustible (nonmetallic) dusts shall comply with NFPA 654.

319.3.6 Combustible metals. Industrial additive manufacturing operations that store or use combustible metals shall comply with NFPA 484.

319.3.7 Ancillary equipment. Ancillary equipment provided for recycling, sieving, vacuuming or handling combustible powders shall be designed and approved for such use.

319.3.8 Hazardous materials. Industrial additive manufacturing operations that store or use hazardous materials exceeding the maximum allowable quantity limits shall comply with Chapter 50.

319.3.9 Inert gas. Additive manufacturing processes that utilize inert gases shall comply with Chapter 53. Ventilation or gas detection shall be provided in accordance with Section 5307.

319.3.10 Technical assistance. Where required by the fire code official, a report evaluating the acceptability of technologies, processes, products, facilities, materials and uses associated with the operation shall be provided in accordance with Section 104.2.2 and approved.

319.3.11 Performance-based design alternative. Where approved by the fire code official, buildings and facilities where industrial additive manufacturing is performed shall be permitted to comply with the performance-based design options in Section 5001.3 as an alternative to compliance with the other requirements set forth in this section.

319.3.12 Occupancies. Industrial additive manufacturing shall be conducted only in the occupancy groups associated with manufacturing operation and permitted by the Chapter 50 maximum allowable quantity tables. Where approved, the requirements in Section 319.3.6 shall be permitted to provide the technical basis for determining compliance with Table 5003.1.1(1), Note q.

SECTION 320—BATTERY STORAGE

320.1 General. The storage of batteries shall comply with Section 320.

Exceptions:

1. New or refurbished batteries installed in the equipment, devices or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment, devices or vehicles they are designed to power.
3. Batteries in original retail packaging that are rated at not more than 300 watt-hours for lithium-ion batteries or contain not more than 25 grams of lithium metal for lithium metal batteries.
4. Temporary storage of batteries or battery components during the battery manufacturing process prior to completion of final quality control checks.
5. Temporary storage of batteries during the vehicle manufacturing or repair process.
6. *Batteries in use, staged for use after charging, or charging for use with equipment that are rated at 300 watt-hours or less for lithium-ion batteries or contain 25 grams or less of lithium metal for lithium metal batteries.*

320.1.1 Lithium-ion and lithium metal batteries. *The storage of lithium-ion and lithium-metal batteries shall comply with Sections 320.2 through 320.4.3.3.*

320.1.2 Other battery types. *Batteries in storage, other than lithium-ion or lithium-metal batteries, shall comply with Sections 320.5 through 320.5.6.*

320.2 Permits. Permits shall be required for an accumulation of more than 15 cubic feet (0.42 m^3) of lithium-ion and lithium metal batteries, other than batteries listed in the exceptions to Section 321.1, as set forth in Section 105.5.28.

320.3 Fire safety plan. A fire safety plan shall be provided in accordance with Section 404. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

320.4 Storage requirements. Lithium-ion and lithium metal batteries shall be stored in accordance with Section 320.4.1, 320.4.2 or 320.4.3, as applicable.

320.4.1 Limited indoor storage in containers. *A maximum volume of 15 cubic feet (0.42 m^3) of lithium-ion or lithium metal batteries per fire area shall be permitted where stored in accordance with any of the methods provided in Sections 320.4.1.1 through 320.4.1.3.*

320.4.1.1 Used or unwanted battery collection. *Areas where used or unwanted lithium-ion or lithium-metal batteries are collected from the public or employees shall comply with all of the following:*

1. Containers shall be open top and constructed of noncombustible materials or shall be approved for battery collection.
2. Individual containers and groups of containers shall not exceed a capacity of 7.5 cubic feet (0.21 m^3).
3. A second container or group of containers shall be separated by not less than 3 feet (914 mm) of open space or 10 feet (3048 mm) of space that contains combustible materials.
4. Containers shall be located not less than 5 feet (1524 mm) from exits or exit access doors.

320.4.1.2 Waste storage. *Waste batteries that are packaged in accordance with DOTn shipping requirements.*

320.4.1.3 Miscellaneous storage. *Limited storage of lithium-ion or lithium metal batteries, other than collection of used or unwanted batteries or waste storage, shall comply with any of the following:*

1. *Stored in containers complying with Section 320.4.1.1.*
2. *Stored in original wholesale packaging or containers complying with DOTn regulations.*
3. *Approved battery storage cabinets.*
4. *Other approved storage methods.*

320.4.2 Indoor storage areas. Indoor storage areas for lithium-ion and lithium metal batteries, other than those complying with Section 320.4.1, shall comply with Sections 320.4.2.1 through 320.4.2.6.

320.4.2.1 Technical opinion and report. A technical opinion and report complying with Section 104.2.2 shall be prepared to evaluate the fire and explosion risks associated with the indoor storage area and to make recommendations for fire and explosion protection. The report shall be submitted to the fire code official and shall require the fire code official's approval prior to issuance of a permit. In addition to the requirements of Section 104.2.2, the technical opinion and report shall specifically evaluate the following:

1. The potential for deflagration of flammable gases released during a thermal runaway event.
2. The basis of design for an automatic sprinkler system or other approved fire suppression system. Such design basis shall reference relevant full-scale fire testing or another approved method of demonstrating sufficiency of the recommended design.

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320.4.2.2 Construction requirements. Where indoor storage areas for lithium-ion and lithium metal batteries are located in a building with other uses, battery storage areas shall be separated from the remainder of the building by 2-hour rated fire barriers or horizontal assemblies. Fire barriers shall be constructed in accordance with Section 707 of the *California Building Code*, and horizontal assemblies shall be constructed in accordance with Section 711 of the *California Building Code*.

Exceptions:

1. Where battery storage is contained in one or more approved prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure, fire barriers and horizontal assemblies are not required.
2. Where battery storage is limited to new batteries in packaging that has been demonstrated to and approved by the fire code official as sufficient to isolate a fire in packaging to the package interior, fire barriers and horizontal assemblies are not required.

320.4.2.3 Fire protection systems. Indoor storage areas for lithium-ion and lithium metal batteries shall be protected by an automatic sprinkler system complying with Section 903.3.1.1 or an approved alternative fire suppression system.

320.4.2.4 Fire alarm systems. Indoor storage areas for lithium-ion and lithium metal batteries shall be provided with an approved automatic fire detection and alarm system complying with Section 907. The fire detection system shall use air-aspirating smoke detection, radiant energy-sensing fire detection or both.

320.4.2.5 Explosion control. Where the approved technical opinion and report required by Section 320.4.2.1 recommends explosion control, explosion control complying with Section 911 shall be provided.

320.4.2.6 Reduced requirements for storage of partially charged batteries. Indoor storage areas for lithium-ion and lithium metal batteries with a demonstrated state of charge not exceeding 30 percent shall not be required to comply with Sections 320.4.2.1, 320.4.2.2 and 320.4.2.5, provided that procedures for limiting and verifying that the state of charge will not exceed 30 percent have been approved.

320.4.3 Outdoor storage. Outdoor storage of lithium-ion or lithium metal batteries shall comply with Sections 320.4.3.1 through *320.4.3.6*.

320.4.3.1 Technical opinion and report. *A technical opinion and report complying with Section 104.8.2 shall be prepared to evaluate the fire and explosion risks associated with outdoor storage of lithium-ion and lithium-metal batteries and to make recommendations for fire and explosion protection. The report shall be submitted to the fire code official and shall require the fire code official's approval. In addition to the requirements of Section 104.2.2, the technical opinion and report shall evaluate all of the following:*

1. *Compliance with this section.*
2. *Firefighting access and water supply for emergencies involving outdoor battery storage.*
3. *Outdoor battery fire and explosion hazards*
4. *Hazards involving flying debris during fire incidents igniting adjacent storage areas, buildings, or other exposure hazards.*
5. *Handling, storage, and monitoring of damaged batteries and post-fire monitoring.*

320.4.3.2 **Distance from storage to exposures.** Outdoor storage of lithium-ion or lithium metal batteries shall comply with one of the following:

1. Battery storage shall be located not less than 20 feet (6096 mm) from any building, lot line, public street, public alley, public way or means of egress.
2. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way or means of egress, where the battery storage is separated by a 2-hour fire-resistance-rated assembly without openings or penetrations and extending 5 feet (1524 mm) above and to the sides of the battery storage area.
3. Battery storage shall be located not less than 3 feet (914 mm) from any building, lot line, public street, public alley, public way or means of egress, where batteries are contained in approved, prefabricated portable structures providing a complete 2-hour fire-resistance-rated enclosure.
4. *A maximum of 15 cubic feet of lithium-ion or lithium metal batteries or cells packaged in accordance with DOTn shipping requirements where not less than 3 feet (914 mm) from any building with noncombustible exterior walls, lot line, public street, public alley, public way or means of egress.*

320.4.3.3 **Storage area size limits and separation.** Outdoor storage areas for lithium-ion or lithium metal batteries shall not exceed 900 square feet (83.6 m^2). The height of battery storage in such areas shall not exceed 10 feet (3048 mm). Multiple battery storage areas shall be separated from each other by not less than *20 feet (6096 mm)* of open space.

320.4.3.4 **Fire detection.** Outdoor storage areas for lithium-ion or lithium metal batteries *exceeding 900 square feet (371 m^2),* regardless of whether such areas are open, under weather protection or in a prefabricated portable structure, shall be provided with an approved automatic fire detection and alarm system complying with Section 907. The fire detection system shall use radiant energy-sensing fire detection.

320.4.3.5 Containers. *Containers for outdoor storage of used or waste batteries shall be open-top and constructed of noncombustible materials, containers complying with DOTn regulations for lithium-ion and lithium-metal transportation or shall be approved for battery collection and storage.*

320.4.3.6 Weather protection. *Where weather protection is provided for sheltering outdoor lithium-ion or lithium metal battery storage or use areas, such areas shall be considered outdoor storage or use where the weather protection structure complies with all of the following:*

1. *Walls shall not obstruct more than one side or more than 25 percent of the perimeter of the storage area.*
2. *The overhead structure shall be of approved noncombustible construction with a maximum area of 3,600 square feet (334.5 m^2).*
3. *The distance from the structure to buildings, lot lines, public ways or means of egress to a public way shall be not less than the distance required for an outside storage in Section 320.4.3.2.*
4. *Weather protection structures used for sheltering lithium-ion or lithium metal battery storage shall be separated from lithium-ion or lithium metal battery piles or additional weather protection structures used to shelter lithium-ion or lithium metal battery storage by not less than 20 feet (4572 mm).*
5. *The height of battery storage in such areas shall not exceed 10 feet (3048 mm).*

320.5 Other battery types, general. *Batteries in storage, other than lithium-ion or lithium metal batteries, with a volume of more than 15 cubic feet (0.42 m^3) within a fire area shall be in compliance with Sections 320.5.1 through 320.5.6.*

320.5.1 Structural and seismic design. *Storage shall be protected against accidental dislodgement. Racks and shelving used for storage shall be designed in accordance with the California Building Code as applicable.*

320.5.2 Impact protection. *Where battery storage is subject to vehicle traffic, the storage shall be protected against impact in accordance with Section 312 or other approved methods.*

320.5.3 Battery charging. *Battery charging shall be performed in accordance with manufacturer instructions utilizing listed or approved charging devices.*

320.5.4 Mechanical exhaust system. *Where battery charging can produce flammable gases a mechanical exhaust system shall be provided in accordance with the California Mechanical Code. The mechanical exhaust system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room or area during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.*

320.5.5 Spill control. *Spill control supplies shall be provided to control liquid electrolyte spills. The method shall be capable of controlling a spill from the single largest battery stored or handled.*

320.5.6 Hazard warning signage. *The entrances to battery storage areas shall be provided with warning signage that states, "BATTERY STORAGE AREA" and "ENERGIZED ELECTRICAL DEVICES" and lists the types of batteries present. The size, color, and lettering shall be approved.*

SECTION 321—ARTIFICIAL COMBUSTIBLE VEGETATION

321.1 Artificial combustible vegetation on roofs and near buildings. Artificial combustible vegetation exceeding 6 feet (1829 mm) in height and permanently installed outdoors within 5 feet (1524 mm) of a building or on the roof of a building shall comply with Section 807.4.1. The placement of artificial combustible vegetation shall also comply with Sections 806.3 and 807.4.2.

Exception: Artificial decorative vegetation located more than 30 feet (9144 mm) from the exterior wall of a building.

SECTION 322—POWERED MICROMOBILITY DEVICES

322.1 General. Lithium-ion and lithium metal battery powered micromobility devices shall be operated and maintained in accordance with this section.

Exceptions:

1. Storage, repair and charging in residential occupancies of powered mobility devices, provided that such devices are for personal use by its owner.
2. Charging of a single powered mobility device in any occupancy by its owner.

322.1.1 Prohibited locations. The use of a residential occupancy as a business for the charging of commercially owned powered micromobility devices as part of a rental or sales service shall not be permitted.

322.2 Battery chargers and equipment. Powered micromobility devices shall be charged in accordance with their listing and the manufacturer's instructions using only the original equipment manufacturer-supplied charging equipment or charging equipment in accordance with the listing and manufacturer's instructions.

322.3 Listing. Powered micromobility devices shall be listed and labeled in accordance with UL 2272 or UL 2849, as applicable.

322.4 Battery charging areas. Where approved, powered micromobility devices shall permitted to be charged in a room or area that complies with all of the following:

1. Only listed devices utilizing listed charging equipment shall be permitted to be charged.
2. Is provided with sufficient electrical receptacles to allow the charging equipment for each device to be directly connected to a receptacle. Extension cords and relocatable power taps shall not be used.
3. Storage of combustible materials, combustible waste or hazardous materials shall not be permitted.
4. The charging operation shall not be conducted in or obstruct any required means of egress.

5. Removable storage batteries shall not be stacked or charged in an enclosed cabinet unless the cabinet is specially designed and approved for such purpose.
6. A minimum distance of 18 inches (457.2 mm) shall be maintained between each removable storage battery during charging operations unless each battery is isolated from neighboring batteries by an approved fire-resistant material.
7. A minimum of 18 inches (457.2 mm) shall be maintained between the location of the battery on each powered micromobility device during charging operations.
8. The indoor room or area shall be protected by a fire alarm system utilizing air-aspirating smoke detectors or radiant energy-sensing fire detection.

322.5 Fire safety plan. A fire safety plan shall be provided in accordance with Section 403.10.6. In addition, the fire safety plan shall include emergency response actions to be taken upon detection of a fire or possible fire involving lithium-ion or lithium metal battery storage.

SECTION 323—ROAD TUNNELS, BRIDGES AND OTHER LIMITED ACCESS HIGHWAYS [SFM]

323.1 General. *Road tunnels, bridges and other limited access highways that are state owned shall comply with NFPA 502.*

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 4 – EMERGENCY PLANNING AND PREPAREDNESS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						CSA	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below			**X**																				
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
401 — *401.9*			X																				
402			X																				
403			X																				
[T-19 §3.13 (a)(1)]				X																			
[T-19 §3.13 (c)(1)]				X																			
404.1			X																				
[T-19 §3.10]				X																			
[T-19 §3.13 (a)(2)]				X																			
[T-19 §3.13 (b)]				X																			
404.5-404.6.6			X																				
405			X																				
[T-19 §3.13 (a)(1)]				X																			
[T-19 §3.13 (c)(2 & 3)]				X																			
406			X																				
407			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

4 EMERGENCY PLANNING AND PREPAREDNESS

User notes:

About this chapter: Chapter 4 addresses the human contribution to life safety in buildings when a fire or other emergency occurs. The requirements for continuous training and scheduled fire, evacuation and lockdown drills can be as important as the required periodic inspections and maintenance of built-in fire protection features. The level of preparation by the occupants also improves the emergency responders' abilities during an emergency. The *California Building Code* focuses on built-in fire protection features, such as automatic sprinkler systems, fire-resistance-rated construction and properly designed egress systems, whereas this chapter fully addresses the human element.

SECTION 401—GENERAL

401.1 Scope. Reporting of emergencies, coordination with emergency response forces, emergency plans and procedures for managing or responding to emergencies shall comply with the provisions of this section.

Exception: Firms that have approved on-premises firefighting organizations and that are in compliance with approved procedures for fire reporting.

401.2 Approval. Where required by this code, fire safety plans, emergency procedures and employee training programs shall be approved by the fire code official.

401.3 Emergency responder notification. Notification of emergency responders shall be in accordance with Sections 401.3.1 through 401.3.3.

401.3.1 Fire events. In the event an unwanted fire occurs on a property, the owner or occupant shall immediately report such condition to the fire department.

401.3.2 Alarm activations. Upon activation of a fire alarm signal, employees or staff shall immediately notify the fire department.

401.3.3 Delayed notification. A person shall not, by verbal or written directive, require any delay in the reporting of a fire to the fire department.

401.3.4 Group E fire alarm initiation. *Every person and public officer managing, controlling or in charge of any public, private or parochial school shall cause the fire alarm signal to be sounded upon the discovery of fire.*

401.4 Required plan implementation. In the event an unwanted fire is detected in a building or a fire alarm activates, the emergency plan shall be implemented.

401.5 Making false report. A person shall not give, signal or transmit a false alarm.

401.6 Emergency evacuation drills. The sounding of a fire alarm signal and the carrying out of an emergency evacuation drill in accordance with the provisions of Section 405 shall be allowed.

401.7 Unplanned evacuation. Evacuations made necessary by the unplanned activation of a fire alarm system or by any other emergency shall not be substituted for a required evacuation drill.

401.8 Interference with fire department operations. It shall be unlawful to interfere with, attempt to interfere with, conspire to interfere with, obstruct or restrict the mobility of or block the path of travel of a fire department emergency vehicle in any way, or to interfere with, attempt to interfere with, conspire to interfere with, obstruct or hamper any fire department operation.

401.9 Evacuation of buildings. *Upon notification of fire, conduct of any fire drill, upon activation of the fire alarm, or upon orders of the fire authority having jurisdiction, buildings or structures within the scope of these regulations shall be immediately evacuated or occupants shall be relocated in accordance with established plans.*

SECTION 402—DEFINITIONS

402.1 Definitions. The following terms are defined in Chapter 2:

EMERGENCY EVACUATION DRILL.

LOCKDOWN.

SECTION 403 —EMERGENCY PREPAREDNESS REQUIREMENTS

403.1 General. In addition to the requirements of Section 401, occupancies, uses and outdoor locations shall comply with the emergency preparedness requirements set forth in Sections 403.2 through *403.10.6*. Where a fire safety and evacuation plan is required by Sections 403.2 through 403.10.6, evacuation drills shall be in accordance with Section 405 and employee training shall be in accordance with Section 406.

403.2 Group A occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group A occupancies, other than those occupancies used exclusively for purposes of religious worship with an occupant load less than 2,000, and for buildings containing both a Group A occupancy and an atrium. Group A occupancies shall comply with Sections 403.2.1 through 403.2.4.

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403.2.1 Seating plan. In addition to the requirements of Section 404.2, the fire safety and evacuation plans for assembly occupancies shall include a detailed seating plan, occupant load and occupant load limit. Deviations from the approved plans shall be allowed provided that the occupant load limit for the occupancy is not exceeded and the aisles and exit accessways remain unobstructed.

403.2.2 Announcements. In theaters, motion picture theaters, auditoriums and similar assembly occupancies in Group A used for noncontinuous programs, an audible announcement shall be made not more than 10 minutes prior to the start of each program to notify the occupants of the location of the exits to be used in the event of a fire or other emergency.

Exception: In motion picture theaters, the announcement is allowed to be projected on the screen in a manner approved by the fire code official.

403.2.3 Fire watch personnel. Fire watch personnel shall be provided where required by Section 403.11.1.

403.2.4 Crowd managers. Crowd managers shall be provided where required by Section 403.11.3.

403.3 Group B occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group B occupancy where the Group B occupancy has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge and for buildings having an ambulatory care facility.

403.3.1 Ambulatory care facilities. Ambulatory care facilities shall comply with the requirements of Sections 401, 403.3.1.1 through 403.3.1.2 and 404 through 406.

403.3.1.1 Fire safety and evacuation plan. The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. This shall include procedures for stabilizing care recipients in a defend-in-place response, staged evacuation, or full evacuation in conjunction with the entire building if part of a multitenant facility.

403.3.1.1.1 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include all of the following in addition to the requirements of Section 404:

1. Locations of care recipients who are rendered incapable of self-preservation.
2. Maximum number of care recipients rendered incapable of self-preservation.
3. Area and extent of each ambulatory care facility.
4. Location of any special locking arrangements.

403.3.1.2 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by the staff at intervals not exceeding three months. Training of new staff shall be provided promptly on entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

403.4 Group E occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group E occupancies and for buildings containing both a Group E occupancy and an atrium. Group E occupancies shall comply with Sections 403.4.1 through *403.4.4*.

[California Code of Regulations, Title 19, Division 1, §3.13(a)(1)] Fire Drills. (Group E Occupancies)

(a) Group E Occupancies.

(1) General. Every person and public officer managing, controlling or in charge of any public, private or parochial school shall cause the fire alarm signal to be sounded upon the discovery of fire. Every person and public officer managing, controlling or in charge of any public, private or parochial school, other than a two-year community college, shall cause the fire alarm signal to be sounded not less than once every calendar month at the elementary and intermediate levels, and not less than twice yearly at the secondary level, in the manner prescribed in California Code of Regulations, Title 24, Part 2, Section 907.

A fire drill shall be held at the secondary level not less than twice every school year.

403.4.1 Group E Occupancies. *Every person and public officer managing, controlling or in charge of any public, private or parochial school, other than a two-year community college, shall cause the fire alarm signal to be sounded not less than once every calendar month at the elementary and intermediate levels, and not less than twice yearly at the secondary level in the manner prescribed in Section 907. A fire drill shall be held at the secondary level not less than twice every school year.*

403.4.1.1 Emergency Pre-Fire Planning. *Each school principal, district superintendent or day nursery manager shall, in cooperation with the enforcing agency, prepare procedures to be followed in case of fire or other emergency. They should include the following:*

1. *Posting of the telephone number of the fire department in the office and/or at the main switchboard.*
2. *Assignment of a responsible person to call the fire department upon notification of any fire or activation of the alarm system for any reason other than fire drills.*
3. *Posting in a conspicuous place in each classroom or assembly area a plan showing paths of travel to evacuate the room in case of emergency and including an alternate route.*
4. *Posting in each classroom instructions to be followed by the teacher. These should include:*
   - *4.1. Maintaining of order during evacuation.*
   - *4.2. Removal of roll call book and calling of roll when designated evacuation area is reached.*

403.4.2 **First emergency evacuation drill.** The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

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***403.4.3* Time of day.** Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when the school is at assembly, during the recess or gymnastic periods, or during other times to avoid distinction between drills and actual fires.

***403.4.4* Assembly points.** Outdoor assembly areas shall be designated and shall be located a safe distance from the building being evacuated so as to avoid interference with fire department operations. The assembly areas shall be arranged to keep each class separate to provide accountability of all individuals.

403.5 Group F occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group F occupancy where any of the following conditions apply:

1. The Group F occupancy has an occupant load of 500 or more persons.
2. The Group F occupancy has an occupant load of more than 100 persons above or below the lowest level of exit discharge.
3. Group F pallet manufacturing and recycling facilities as required by Section 2810.

403.6 Group H occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group H occupancies.

403.6.1 Group H-5 occupancies. Group H-5 occupancies shall comply with Sections 403.6.1.1 through 403.6.1.4.

403.6.1.1 Plans and diagrams. In addition to the requirements of Section 404 and Section 407.6, plans and diagrams shall be maintained in approved locations indicating the approximate plan for each area; the amount and type of HPM stored, handled and used; locations of shutoff valves for HPM supply piping; emergency telephone locations and locations of exits.

403.6.1.2 Plan updating. The plans and diagrams required by Sections 404, 403.6.1.1 and 407.6 shall be maintained up-to-date and the fire code official and fire department shall be informed of major changes.

403.6.1.3 Emergency response team. Responsible persons shall be designated as an on-site emergency response team and trained to be liaison personnel for the fire department. These persons shall aid the fire department in preplanning emergency responses, identifying locations where HPM is stored, handled and used, and be familiar with the chemical nature of such material. An adequate number of personnel for each work shift shall be designated.

403.6.1.4 Emergency drills. Emergency drills of the on-site emergency response team shall be conducted on a regular basis but not less than once every three months. Records of drills conducted shall be maintained.

403.7 Group I occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group I occupancies. Group I occupancies shall comply with Sections 403.7.1 through 403.7.3.6.

403.7.1 Group *R-2.1* occupancies. Group *R-2.1* occupancies shall comply with Sections 403.7.1.1 through 403.7.1.4.

403.7.1.1 Fire safety and evacuation plan. The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for full evacuation of care recipients.
2. In Group *R-2.1*, procedures for staged evacuation of care recipients through a refuge area in an adjacent smoke compartment and then to an exterior assembly point. ⬅
3. Shall be amended or revised upon admission of any resident care recipient with unusual needs.

403.7.1.1.1 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include the following in addition to the requirements of Section 404.2.2:

1. Location and number of care recipient sleeping rooms.
2. Location of special locking arrangements.

403.7.1.2 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding three months. Training of new staff shall be provided promptly upon entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

403.7.1.3 Resident training. Residents capable of assisting in their own evacuation shall be trained in the proper actions to take in the event of a fire. In Group *R-2.1* occupancies, training shall include evacuation through an adjacent smoke compartment and then to an exterior assembly point. The training shall include actions to take if the primary escape route is blocked. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk. ⬅

403.7.1.4 Drill frequency. In addition to the evacuation drills required in Section 405.3, staff shall participate in drills an additional two times a year on each shift. Twelve drills with all occupants shall be conducted in the first year of operation.

403.7.2 Group I-2 occupancies. Group I-2 occupancies shall comply with 403.7.2.1 through 403.7.2.5.

403.7.2.1 Fire safety and evacuation plan. The fire safety and evacuation plans required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for evacuation for care recipients with needs for containment or restraint and post-evacuation containment, where present.
2. A written plan for maintenance of the means of egress.
3. Procedure for a defend-in-place strategy.

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4. Procedures for a full-floor or building evacuation, where necessary.
5. In Group I-2, amendments or revisions upon admission of any care recipients with unusual needs.

403.7.2.2 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include all of the following in addition to the requirements of Section 404.2.2:

1. Location and number of care recipient sleeping rooms and operating rooms.
2. Location of special locking arrangements.

403.7.2.3 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding three months. Training of new staff shall be provided promptly upon entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

403.7.2.4 Emergency evacuation drills. Emergency evacuation drills shall comply with Section 405.

403.7.2.5 Fire loss prevention in operating rooms. Fire protection features and procedures for fire loss prevention in surgical operating rooms shall comply with NFPA 99, Section 16.13.

403.7.3 Group I-3 occupancies. Group I-3 occupancies shall comply with Sections 403.7.3.1 through 403.7.3.6.

403.7.3.1 Fire safety and evacuation plans. The fire safety and evacuation plans required by Section 404 shall include a description of special staff actions. Plans shall include all of the following in addition to the requirements of Section 404:

1. Procedures for evacuation of detainees with needs for containment or restraint and post-evacuation containment, where present.
2. Procedures for a defend-in-place strategy.
3. Procedures for a full-floor or building evacuation, where necessary.

403.7.3.2 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include both of the following in addition to the requirements of Section 404.2.2:

1. Location and number of cells.
2. Location of special locking arrangements.

403.7.3.3 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding 3 months. Training of new staff shall be provided promptly upon entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

403.7.3.4 Staffing. Group I-3 occupancies shall be provided with 24-hour staffing. A staff person shall be within three floors or 300 feet (91 440 mm) horizontal distance of the access door of each resident housing area. In Group I-3 Conditions 3, 4 and 5, as defined in Chapter 2, the arrangement shall be such that the staff involved can start release of locks necessary for emergency evacuation or rescue and initiate other necessary emergency actions within 2 minutes of an alarm.

Exception: A staff person shall not be required to be within three floors or 300 feet (91 440 mm) horizontal distance of the access door of each resident housing area in areas in which all locks are unlocked remotely and automatically in accordance with Section 408.4 of the *California Building Code*.

403.7.3.5 Notification. Provisions shall be made for residents in Group I-3 Conditions 3, 4 and 5, as defined in Chapter 2, to readily notify staff of an emergency.

403.7.3.6 Keys. Keys necessary for unlocking doors installed in a means of egress shall be individually identifiable by both touch and sight.

403.8 Group M occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for buildings containing a Group M occupancy where the Group M occupancy has an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge and for buildings containing both a Group M occupancy and an atrium.

403.9 Group R occupancies. Group R occupancies shall comply with Sections 403.9.1 through 403.9.3.4.

403.9.1 Group R-1 occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-1 occupancies. Group R-1 occupancies shall comply with Sections 403.9.1.1 through 403.9.1.3.

403.9.1.1 Evacuation diagrams. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each hotel or motel dwelling unit or sleeping unit.

403.9.1.2 Emergency duties. Upon discovery of a fire or suspected fire, hotel and motel employees shall perform the following duties:

1. Activate the fire alarm system, where provided.
2. Notify the public fire department.
3. Take other action as previously instructed.

403.9.1.3 Fire safety and evacuation instructions. Information shall be provided in the fire safety and evacuation plan required by Section 404 to allow guests to decide whether to evacuate to the outside, evacuate to an area of refuge, remain in place, or any combination of the three.

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403.9.2 Group R-2 occupancies. Group R-2 occupancies shall comply with Sections 403.9.2.1 through 403.9.2.3.

403.9.2.1 College and university buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-2 college and university buildings. Group R-2 college and university buildings shall comply with Sections 403.9.2.1.1 *through 403.9.2.1.3.*

403.9.2.1.1 College and University Pre-Fire Planning. *The Chancellor, President, or his designated representative, shall, in cooperation with the enforcing agency, propose procedures to be followed in case of fire or other emergency. They should include the following:*

1. *Posting the telephone number of the fire department in the office and/or at the main switchboard.*
2. *Assignment of a responsible person to call the fire department upon notification of any fire or activation of the alarm system for any reason other than fire drills.*
3. *Posting in a conspicuous place in each classroom or assembly area a plan showing paths of travel to evacuate the room in case of emergency and including an alternate route.*
4. *Posting in each classroom instructions to be followed by the teacher. These should include:*
    - *4.1. Maintaining order during evacuation.*
    - *4.2. Removal of roll call book and calling of roll when designated evacuation area is reached.*

403.9.2.1.2 **First emergency evacuation drill.** The first emergency evacuation drill of each school year shall be conducted within 10 days of the beginning of classes.

403.9.2.1.3 **Time of day.** Emergency evacuation drills shall be conducted at different hours of the day or evening, during the changing of classes, when school is at assembly, during recess or gymnastic periods or during other times to avoid distinction between drills and actual fires. One required drill shall be held during hours after sunset or before sunrise.

403.9.2.2 Emergency guide. Fire emergency guides shall be provided for Group R-2 occupancies. Guide contents, maintenance and distribution shall comply with Sections 403.9.2.2.1 through 403.9.2.2.3.

403.9.2.2.1 Guide contents. A fire emergency guide shall describe the location, function and use of fire protection equipment and appliances available for use by residents, including fire alarm systems, smoke alarms and portable fire extinguishers. Guides shall include an emergency evacuation plan for each dwelling unit.

403.9.2.2.2 Emergency guide maintenance. Emergency guides shall be reviewed and approved by the fire code official.

403.9.2.2.3 Emergency guide distribution. A copy of the emergency guide shall be given to each tenant prior to initial occupancy.

403.9.2.3 Evacuation diagrams for dormitories. A diagram depicting two evacuation routes shall be posted on or immediately adjacent to every required egress door from each dormitory sleeping unit or dwelling unit. Evacuation diagrams shall be reviewed and updated as needed to maintain accuracy.

403.9.3 Group R-4 occupancies. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for Group R-4 occupancies. Group R-4 occupancies shall comply with Sections 403.9.3.1 through 403.9.3.4.

403.9.3.1 Fire safety and evacuation plan. The fire safety and evacuation plan required by Section 404 shall include a description of special staff actions. Plans shall include procedures necessary for full evacuation of care recipients, and shall be amended or revised upon admission of care recipients with unusual needs.

403.9.3.1.1 Fire safety plan. A copy of the fire safety plan shall be maintained at the facility at all times. The plan shall include the following in addition to the requirements of Section 404.2.2:

1. Location and number of care recipient sleeping rooms.
2. Location of special locking arrangements.

403.9.3.2 Staff training. Staff shall be periodically instructed and kept informed of their duties and responsibilities under the plan. Records of instruction shall be maintained. Such instruction shall be reviewed by staff at intervals not exceeding three months. Training of new staff shall be provided promptly upon entrance to duty.

Staff shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

403.9.3.3 Resident training. Residents capable of assisting in their own evacuation shall be trained in the proper actions to take in the event of a fire. The training shall include actions to take if the primary escape route is blocked. Residents shall be trained to assist each other in case of fire to the extent their physical and mental abilities permit them to do so without additional personal risk.

403.9.3.4 Drill frequency. In addition to the evacuation drills required in Section 405.3, staff shall participate in drills an additional two times a year on each shift. Twelve drills with all occupants shall be conducted in the first year of operation.

403.10 Special uses. Special uses shall be in accordance with Sections 403.10.1 through 403.10.6.1.

403.10.1 Covered and open mall buildings. Covered and open mall buildings shall comply with the requirements of Sections 403.10.1.1 through 403.10.1.6.

403.10.1.1 Malls and mall buildings exceeding 50,000 square feet. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for covered malls exceeding 50,000 square feet (4645 m^2) in

aggregate floor area and for open mall buildings exceeding 50,000 square feet (4645 m^2) in aggregate area within the perimeter line.

403.10.1.2 Lease plan. In addition to the requirements of Section 404.2.2, a lease plan that includes the following information shall be prepared for each covered and open mall building:

1. Each occupancy, including identification of tenant.
2. Exits from each tenant space.
3. Fire protection features, including the following:
    3.1. Fire department connections.
    3.2. Fire command center.
    3.3. Smoke management system controls.
    3.4. Elevators, elevator machine rooms and controls.
    3.5. Hose valve outlets.
    3.6. Sprinkler and standpipe control valves.
    3.7. Areas protected with automatic sprinkler systems and automatic fire-extinguishing systems.
    3.8. Automatic fire detector zones.
    3.9. Fire barriers.

403.10.1.3 Lease plan approval. The lease plan shall be submitted to the fire code official for approval, and shall be maintained on-site for immediate reference by responding fire service personnel.

403.10.1.4 Lease plan revisions. The lease plans shall be revised annually or as often as necessary to keep them current. Modifications or changes in tenants or occupancies shall not be made without prior approval of the fire code official and building official.

403.10.1.5 Tenant identification. Tenant identification shall be provided for secondary exits from occupied tenant spaces that lead to an exit corridor or directly to the exterior of the building. Tenant identification shall be posted on the exterior side of the exit or exit access door and shall identify the business name and address using plainly legible letters and numbers that contrast with their background.

Exception: Tenant identification is not required for anchor stores.

403.10.1.6 Unoccupied tenant spaces. The fire safety and evacuation plan shall provide for compliance with the requirements for unoccupied tenant spaces in Section 311.

403.10.2 High-rise buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for high-rise buildings.

403.10.3 Underground buildings. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for underground buildings.

403.10.4 Buildings using occupant evacuation elevators. In buildings using occupant evacuation elevators in accordance with Section 3008 of the *California Building Code*, the fire safety and evacuation plan and the training required by Sections 404 and 406, respectively, shall incorporate specific procedures for the occupants using such elevators.

403.10.5 Buildings with high-piled storage. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared for buildings with high-piled combustible storage in any of the following situations:

1. The high-piled storage area exceeds 500,000 square feet (46 450 m^2) for Class I-IV commodities.
2. The high-piled storage area exceeds 300,000 square feet (27 870 m^2) for high-hazard commodities.
3. The high-piled storage is located in a Group H occupancy.
4. The high-piled storage is located in a Group F occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
5. The high-piled storage is located in a Group M occupancy with an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
6. Where required by the fire code official for other high-piled storage areas.

403.10.6 Lithium-ion and lithium metal batteries. An approved fire safety and evacuation plan in accordance with Section 404 shall be prepared and maintained for occupancies that involve activities for the research and development, testing, manufacturing, handling or storage of lithium-ion batteries or lithium metal batteries, or the repair or servicing of vehicles powered by lithium-ion batteries or lithium metal batteries.

Exceptions: A fire safety and evacuation plan is not required for the storage or merchandizing of any of the following:

1. New or refurbished batteries installed for use in the equipment or vehicles they are designed to power.
2. New or refurbished batteries packed for use with the equipment or vehicles they are designed to power for merchandizing purposes.
3. New or refurbished lithium-ion batteries rated at not more than 300 watt-hours and lithium metal batteries containing not more than 25 grams of lithium metal in their original retail packaging.

4. The storage, repair and charging activities in detached one- and two-family dwellings and townhouses, provided that such devices are for personal use.
5. The storage, repair and charging activities associated with personal use in sleeping units and dwelling units of Group R-1 and R-2 occupancies.

403.10.6.1 Mitigation planning. The approved fire safety and evacuation plan shall include thermal runaway event mitigation measures. These measures shall include activities undertaken to prevent thermal runaway, early detection of a thermal runaway event and mitigation measures to be undertaken to limit the size and impact of the event on occupants and the facility.

403.11 Special requirements for public safety. Special requirements for public safety shall be in accordance with Sections 403.11.1 through 403.11.3.3.

403.11.1 Fire watch personnel. Where, in the opinion of the fire code official, it is essential for public safety in a place of assembly or any other place where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the owner, agent or lessee shall provide one or more fire watch personnel, as required and approved. Fire watch personnel shall comply with Sections 403.11.1.1 and 403.11.1.2.

403.11.1.1 Duty times. Fire watch personnel shall remain on duty while places requiring a fire watch are open to the public, or when an activity requiring a fire watch is being conducted.

403.11.1.2 Duties. On-duty fire watch personnel shall have the following responsibilities:

1. Keep diligent watch for fires, obstructions to means of egress and other hazards.
2. Take prompt measures for remediation of hazards and extinguishment of fires that occur.
3. Take prompt measures to assist in the evacuation of the public from the structures.

403.11.2 Public safety plan for gatherings. Where the fire code official determines that an indoor or outdoor gathering of persons has an adverse impact on public safety through diminished access to buildings, structures, fire hydrants and fire apparatus access roads or where such gatherings adversely affect public safety services of any kind, the fire code official shall have the authority to order the development of or prescribe a public safety plan that provides an approved level of public safety and addresses the following items:

1. Emergency vehicle ingress and egress.
2. Fire protection.
3. Emergency egress or escape routes.
4. Emergency medical services.
5. Public assembly areas.
6. The directing of both attendees and vehicles, including the parking of vehicles.
7. Vendor and food concession distribution.
8. The need for the presence of law enforcement.
9. The need for fire and emergency medical services personnel.
10. The need for a weather monitoring person.

403.11.3 Crowd managers. Where facilities or events involve a gathering of more than 500 people, crowd managers shall be provided in accordance with Sections 403.11.3.1 through 403.11.3.3.

403.11.3.1 Number of crowd managers. Not fewer than two trained crowd managers, and not fewer than one trained crowd manager for each 250 persons or portion thereof, shall be provided for the gathering.

Exceptions:

1. Outdoor events with fewer than 1,000 persons in attendance shall not require crowd managers.
2. Assembly occupancies used exclusively for religious worship with an occupant load not exceeding 1,000 shall not require crowd managers.
3. The number of crowd managers shall be reduced where, in the opinion of the fire code official, the fire protection provided by the facility and the nature of the event warrant a reduction.

403.11.3.2 Training. Training for crowd managers shall be approved.

403.11.3.3 Duties. The duties of crowd managers shall include, but not be limited to:

1. Conduct an inspection of the area of responsibility and identify and address any egress barriers.
2. Conduct an inspection of the area of responsibility to identify and mitigate any fire hazards.
3. Verify compliance with all permit conditions, including those governing pyrotechnics and other special effects.
4. Direct and assist the event attendees in evacuation during an emergency.
5. Assist emergency response personnel where requested.
6. Other duties required by the fire code official.
7. Other duties as specified in the fire safety plan.

403.12 Organized camps. *Group C occupancies shall comply with the requirements of Sections 403.12.1 through 403.12.3.*

403.12.1 Staff training and evacuation plan. *Every organized camp shall institute fire training programs for all employees in the use of all fire extinguishing equipment and methods of evacuation, and shall establish procedures which shall, as far as possible, be followed in the event of fire or any other emergency. If located in a forest area a plan shall be prepared for the evacuation of the camp in case of an approaching forest fire or other emergency.*

403.12.2 Resident training. *Within 24 hours after arrival, every group of persons attending an organized camp shall be made familiar with the method by which the fire alarm may be activated and with the procedures to be followed upon notification of fire.*

403.12.3 Fire drills. *At least 1 fire drill shall be held within 24 hours of the commencement of each camping session. Additional drills shall be conducted at least once each week thereafter. When sessions exceed a 7-day period, at least 1 drill shall be held during nighttime sleeping hours.*

[California Code of Regulations, Title 19, Division 1, §3.13(c)(1)] Fire Drills. (Organized Camps)

(c) Organized Camps.

(1) Every organized camp shall institute fire training programs for all employees in the use of all fire extinguishing equipment and methods of evacuation, and shall establish procedures which shall, as far as possible, be followed in the event of fire or any other emergency. If located in a forest area a plan shall be prepared for the evacuation of the camp in case of an approaching forest fire or other emergency.

SECTION 404—FIRE SAFETY, EVACUATION AND LOCKDOWN PLANS

404.1 General. Where required by Section 403 or other sections of this code, fire safety, evacuation and lockdown plans shall comply with Sections 404.2 through 404.4.1.

[California Code of Regulations, Title 19, Division 1, §3.10] Evacuation of Buildings.

Upon notification of fire, conduct of any fire drill, upon activation of the fire alarm, or upon orders of the fire authority having jurisdiction, buildings or structures within the scope of California Code of Regulations, Title 19, Division 1 regulations shall be immediately evacuated or occupants shall be relocated in accordance with established plans.

404.2 Contents. Fire safety, evacuation and lockdown plan contents shall be in accordance with Sections 404.2.1 through 404.2.3.2.

404.2.1 Fire evacuation plans. Fire evacuation plans shall include the following:

1. Emergency egress or escape routes and whether evacuation of the building is to be complete by selected floors or areas only or with a defend-in-place response.
2. Procedures for employees who must remain to operate critical equipment before evacuating.
3. Procedures for the use of elevators to evacuate the building where occupant evacuation elevators complying with Section 3008 of the *California Building Code* are provided.
4. Procedures for assisted rescue for persons unable to use the general means of egress unassisted.
5. Procedures for accounting for employees and occupants after evacuation has been completed.
6. Identification and assignment of personnel responsible for rescue or emergency medical aid.
7. The preferred and any alternative means of notifying occupants of a fire or emergency.
8. The preferred and any alternative means of reporting fires and other emergencies to the fire department or designated emergency response organization.
9. Identification and assignment of personnel who can be contacted for further information or explanation of duties under the plan.
10. A description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages, where provided.

404.2.2 Fire safety plans. Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy including the following:
   - 2.1. Procedures for notifying occupants, including areas with a private mode alarm system.
   - 2.2. Procedures for occupants under a defend-in-place response.
   - 2.3. Procedures for evacuating occupants, including those who need evacuation assistance.
3. Site plans indicating the following:
   - 3.1. The occupancy assembly point.
   - 3.2. The locations of fire hydrants.
   - 3.3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
   - 4.1. Exits.
   - 4.2. Primary evacuation routes.
   - 4.3. Secondary evacuation routes.

4.4. Accessible egress routes.
4.4.1. Areas of refuge.
4.4.2. Exterior areas for assisted rescue.
4.5. Refuge areas associated with smoke barriers and horizontal exits.
4.6. Manual fire alarm boxes.
4.7. Portable fire extinguishers.
4.8. Occupant-use hose stations.
4.9. Fire alarm annunciators and controls.

5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.

[California Code of Regulations, Title 19, Division 1, §3.13(a)(2)] Fire Drills. (Group E Occupancies)

(a) Group E Occupancies.

(2) Emergency Pre-Fire Planning. Each school principal, district superintendent or day nursery manager shall, in cooperation with the enforcing agency, prepare procedures to be followed in case of fire or other emergency. They should include the following:

(A) Posting of the telephone number of the fire department in the office and/or at the main switchboard.

(B) Assignment of a responsible person to call the fire department upon notification of any fire or activation of the alarm system for any reason other than fire drills.

(C) Posting in a conspicuous place in each classroom or assembly area a plan showing paths of travel to evacuate the room in case of emergency and including an alternate route.

(D) Posting in each classroom instructions to be followed by the teacher. These should include:

1. Maintaining of order during evacuation.
2. Removal of roll call book and calling of roll when designated evacuation area is reached.

[California Code of Regulations, Title 19, Division 1, §3.13(b)] Fire Drills. (College and University)

(b) College and University Pre-Fire Planning. The Chancellor, President, or his designated representative, shall, in cooperation with the enforcing agency, propose procedures to be followed in case of fire or other emergency in accordance with the provisions of California Code of Regulations, Title 19, Division 1, Section 3.13 (a)(2).

404.2.3 Lockdown plans. Lockdown plans shall only be permitted where such plans are approved by the fire code official and are in compliance with Sections 404.2.3.1 and 404.2.3.2.

404.2.3.1 Lockdown plan contents. Lockdown plans shall include the following:

1. Identification of individuals authorized to issue a lockdown order.
2. Security measures used during normal operations, when the building is occupied, that could adversely affect egress or fire department operations.
3. A description of identified emergency and security threats addressed by the plan, including specific lockdown procedures to be implemented for each threat condition.
4. Means and methods of initiating a lockdown plan for each threat, including:
   4.1. The means of notifying occupants of a lockdown event, which shall be distinct from the fire alarm signal.
   4.2. Identification of each door or other access point that will be secured.
   4.3. A description of the means or methods used to secure doors and other access points.
   4.4. A description of how locking means and methods are in compliance with the requirements of this code for egress and accessibility.
5. Procedures for reporting to the fire department any lockdown condition affecting egress or fire department operations.
6. Procedures for determining and reporting the presence or absence of occupants to emergency response agencies during a lockdown.
7. Means for providing two-way communication between a central location and each area subject to being secured during a lockdown.
8. Identification of the prearranged signal for terminating the lockdown.
9. Identification of individuals authorized to issue a lockdown termination order.
10. Procedures for unlocking doors and verifying that the means of egress has been returned to normal operations upon termination of the lockdown.

11. Training procedures and frequency of lockdown plan drills.

404.2.3.2 Drills. Lockdown plan drills shall be conducted in accordance with the approved plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.3.

404.3 Maintenance. Fire safety, evacuation and lockdown plans shall be reviewed or updated annually or as necessitated by changes in staff assignments, occupancy or the physical arrangement of the building.

404.4 Availability. Fire safety, evacuation and lockdown plans shall be available in the workplace for reference and review by employees, and copies shall be furnished to the fire code official for review on request.

404.4.1 Distribution. The fire safety, evacuation and lockdown plans shall be distributed to the tenants and building service employees by the owner or owner's agent. Tenants shall distribute to their employees applicable parts of the fire safety plan and lockdown plan affecting the employees' actions in the event of a fire or other emergency.

404.5 College and university pre-fire planning. *The Chancellor, President, or his designated representative, shall, in cooperation with the enforcing agency, propose procedures to be followed in case of fire or other emergency in accordance with the provisions of Section 403.9.2.1.1.*

404.6 Office buildings. *All office buildings two or more stories in height, except high-rise buildings as defined by Health and Safety Code Section 13210, shall comply with this section.*

404.6.1 *Owner(s) or operator(s) shall employ either one of the following methods of providing emergency procedures and information to the building occupants:*

1. *Emergency procedures information published in the form of a leaflet, brochure or pamphlet shall be available to all persons entering the building. Emergency procedures information shall be located immediately inside all entrances to the building, as determined by the authority having jurisdiction. Locations shall be clearly marked.*
2. *A floor plan providing emergency procedures information shall be posted at every stairway landing, at every elevator landing and immediately inside all public entrances to the building. The information shall be posted so that it describes the represented floor level and can be easily seen immediately upon entering the floor level of the building. Emergency procedures information shall be printed with a minimum of $^{3}/_{16}$-inch high nondecorative lettering providing a sharp contrast to the background.*

404.6.1.2 *Emergency procedures information shall provide all ambulatory, nonambulatory and the physically disabled instructions to be followed in the event of an emergency. Emergency procedures information shall include, but not be limited to, the following:*

1. *Location of exits.*
2. *Location of fire alarm initiating stations, if required.*
3. *What the fire alarm, if required, sounds and looks like (audible and visual warning devices).*
4. *Fire department emergency telephone number 911.*
5. *The prohibition of elevator use during emergencies, if any.*

404.6.2 Hotels, motels and lodging houses. *Every guestroom available for rental in a hotel, motel or lodging house shall have clearly visible emergency procedures information printed on a floor plan representative of the floor level and posted on the interior of each entrance door or immediately adjacent to such door. The owner/operator of a hotel, motel or lodging house may, in lieu of posting emergency procedures information in each guestroom, provide such information through the use of leaflets, brochures, pamphlets, videotapes or any other method as approved by the authority having jurisdiction. Oral communication in itself does not fulfill the intent of this section. However, oral communication can be incorporated as a part of the transfer of emergency procedures information. When emergency procedures information signage is posted on the interior of the guestroom entrance door, the bottom of the information shall not be located more than 4-feet above the floor level. Visually impaired persons shall receive instructions of a type they will understand, for example: taping of instructions, instructions in Braille or other appropriate methods.*

404.6.2.1 *Each method of providing information shall include, but not be limited to that described in Section 404.6.1.2.*

404.6.2.2 *Hotels, motels and lodging houses shall maintain at the registration desk a list noting the guestrooms assigned to guests with disabilities when such guests have indicated that they have special emergency evacuation requirements. The innkeeper shall, at the innkeeper's option, do one of the following:*

1. *Provide a place on the registration form for physically disabled guests who have such requirements to so identify themselves.*
2. *Provide a notice on the room key jacket advising guests with disabilities who have special emergency evacuation requirements to so notify the front desk.*
3. *Utilize such other means for allowing such guests with disabilities to so identify themselves as may be approved by the authority having jurisdiction.*

404.6.3 Stairways. *Hotels, motels, lodging houses, high-rise office buildings and Group I, Division 1 and 2 occupancies as defined in the California Building Code (except honor farms and conservation camps) shall comply with this section.*

404.6.3.1 *Emergency procedures information printed on a floor plan shall be posted at every stairway landing, at every elevator landing and immediately inside all public entrances to the building. The information shall be representative of the floor level and be posted so that the bottom edge of such information is not located more than 4-feet above the floor, where it can be easily iden-*

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tified. Emergency procedures information shall be printed with a minimum of $^{3}/_{16}$-inch nondecorative lettering providing a sharp contrast to the background.

404.6.3.1.1 *Emergency procedures information shall include, but not be limited to, that described in Section 404.6.1.2.*

404.6.4 Emergency Director. *Owner(s) and operator(s) of hotels, motels, lodging houses, high-rise office buildings and Group I, Division 1 and 2 occupancies as defined in the California Building Code (except honor farms and conservation camps) shall appoint a Fire Safety Director, who shall:*

1. *Report to owner(s) or operator(s).*
2. *Coordinate fire safety activities of the facility with the authority having jurisdiction.*
3. *Conduct, or cause to be conducted, all training as described in Sections 404.6.5 through 404.6.5.3 for all building employees and maintain records of dates, subjects and attendance of each training session.*
4. *Develop and maintain a written facility emergency plan acceptable to the authority having jurisdiction. Upon request, the facility emergency plan shall be made physically available at the respective facility to the authority having jurisdiction. Facility emergency plans shall include, but not be limited to the following:*
    - *4.1. Fire department emergency telephone number 911.*
    - *4.2. Other emergency response telephone numbers.*
    - *4.3. Evacuation or relocation plan for the building occupants.*
    - *4.4. Duties of the Fire Safety Director and other designated emergency personnel.*
    - *4.5. Building employee responsibilities in case of emergency, including individual assignment and reporting responsibilities.*
    - *4.6. Procedures to identify and assist the nonambulatory and physically disabled.*
5. *Assure that the requirements of Section 404.6.4, item 4, subsection 4.6, procedures to identify and assist the nonambulatory and physically disabled are accomplished as follows:*
    - *5.1. Hotels, motels and lodging houses shall comply with subsection (b)(3);*
    - *5.2. Owner(s) or operator(s) of high-rise office buildings shall maintain a list of all permanent building tenants who have disabilities. Building owner(s) or operator(s) shall be notified in writing by those who have disabilities. Information provided in the list shall include any special emergency evacuation needs and permanent work location of such physically disabled persons. The list shall be located in the building manager's office;*
    - *5.3. Group I, Division 1 and 2 occupancies as defined in the California Building Code (except honor farms and conservation camps) shall comply with normal hospital policies of assisting patients and guests during an emergency evacuation.*

404.6.5 Training. *Hotels, motels, lodging houses and high-rise office buildings shall conduct annually, emergency procedures training for all building employees. Group I, Division 1 and 2 occupancies as defined in the California Building Code (except honor farms and conservation camps) shall conduct quarterly fire emergency training for all building employees.*

404.6.5.1 *Fire Safety Directors and their designated emergency personnel shall receive training in the identification and use of facility fire safety equipment, communication procedures, people movement procedures, fire prevention practices and their duties outlined in their respective emergency plan. The training curriculum shall be approved by, and made available to the authority having jurisdiction.*

404.6.5.2 *All building employees shall receive training covering the identification and use of facility fire safety equipment, fire prevention practices and appropriate procedures to follow in the event of a fire.*

404.6.5.3 *Actual evacuation or relocation of building occupants pursuant to procedures contained in the emergency plan shall be conducted at least annually for all building employees. Appropriate records, including dates, floors or building involved, and persons conducting evacuation or relocation procedures shall be maintained and made immediately available to the authority having jurisdiction upon their request. The authority having jurisdiction shall be notified not less than 48 hours in advance of such planned evacuation or relocation.*

Exception: *In hotels, motels, lodging houses and Group I, Division 1 and 2 occupancies as defined in the California Building Code, guests and patients are not required to participate in evacuation or relocation of the building. In hotels, motels, lodging houses, Group I, Division 1 and 2 occupancies as defined in the California Building Code, and high-rise office buildings, on-duty personnel who have security or maintenance related responsibilities, and designated management personnel approved by the fire authority having jurisdiction shall not be required to participate in any drill but, they shall provide an alternate method approved by the authority having jurisdiction to measure their knowledge of their respective duties pursuant to the emergency plan.*

404.6.6 *Emergency procedures signage posted prior to the effective date of these regulations may be continued in use until one year after such effective date of these regulations.*

SECTION 405—EMERGENCY EVACUATION DRILLS

405.1 General. Emergency fire and evacuation drills complying with Sections 405.3 through 405.10 shall be conducted not less than annually where fire safety and evacuation plans are required by Section 403 or where required by the fire code official. Lockdown plan drills shall be conducted in accordance with the approved plan. Such drills shall not be substituted for fire and evacuation drills required by Section 405.3. Drills shall be designed in cooperation with the local authorities.

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405.2 Occupant participation. Emergency fire and evacuation drills shall involve the actual evacuation of occupants to a selected assembly point and shall provide occupants with experience in exiting through required exits.

Exceptions:

1. In ambulatory care facilities and Group I-2, the movement of care recipients to a safe area or to the exterior of the building is not required.
2. In Group *R-2.1* the assembly point for residents is permitted to be within an adjacent smoke compartment.
3. In Group R-4, actual exiting from emergency escape and rescue openings shall not be required. Opening the emergency escape and rescue openings and signaling for help shall be an acceptable alternative.
4. In Group I-3, Conditions 2 through 5 where a defend-in-place response is permitted, the assembly point for detainees is permitted to be within an adjacent smoke compartment.
5. In Group I-3, Conditions 2 through 5, movement of detainees is not required to an assembly point where there are security concerns.

405.3 Frequency. Required emergency evacuation drills shall be held at the intervals specified in Table 405.3 or more frequently where necessary to familiarize all occupants with the drill procedure.

[California Code of Regulations, Title 19, Division 1, §3.13(a)(1)] Fire Drills. (Group E Occupancies)

(a) Group E Occupancies.

(1) General. Every person and public officer managing, controlling or in charge of any public, private or parochial school shall cause the fire alarm signal to be sounded upon the discovery of fire. Every person and public officer managing, controlling or in charge of any public, private or parochial school, other than a two-year community college, shall cause the fire alarm signal to be sounded not less than once every calendar month at the elementary and intermediate levels, and not less than twice yearly at the secondary level, in the manner prescribed in California Code of Regulations, Title 24, Part 2, Section 907.

A fire drill shall be held at the secondary level not less than twice every school year.

TABLE 405.3—FIRE AND EVACUATION DRILL FREQUENCY AND PARTICIPATION

GROUP OR OCCUPANCY	FREQUENCY	PARTICIPATION
Group A	Quarterly	Staff
Group B[a]	Annually	All occupants
Group B (Ambulatory care facilities)	Quarterly on each shift	Staff
Group B[a] (Clinic, outpatient)	Annually	Staff
Group E	*See Section 403.4*	All occupants
Group F	Annually	Employees
Group I-2	Quarterly on each shift	Staff
Group I-3	Quarterly on each shift	Staff
Group I-4	Monthly on each shift	All occupants
Group R-1	Quarterly on each shift	Employees
Group R-2[b]	*See Section 403.9.2*	All occupants
Group R-4[c]	Semiannually on each shift	All occupants

a. Emergency evacuation drills are required in Group B buildings having an occupant load of 500 or more persons or more than 100 persons above or below the lowest level of exit discharge.
b. Emergency evacuation drills in Group R-2 college and university buildings shall be in accordance with Section 403.9.2.1. Other Group R-2 occupancies shall be in accordance with Section 403.9.2.2.
c. In Group R-4, see Sections 403.7.1.4 and 403.9.3.4 for additional drills for staff.

405.4 Leadership. Responsibility for the planning and conduct of drills shall be assigned to competent persons designated to exercise leadership.

405.5 Time. Drills shall be held at unexpected times and under varying conditions to simulate the unusual conditions that occur in case of fire.

Exceptions:

1. In severe climates, the fire code official shall have the authority to modify the emergency evacuation drill termination points and frequency.
2. In Groups *R-2.1*, I-2, I-3 and R-4, where staff-only emergency evacuation drills are conducted after visiting hours or where care recipients are expected to be asleep, a coded announcement shall be an acceptable alternative to audible alarms.

405.6 Recordkeeping. Records shall be maintained of required emergency evacuation drills and include the following information:

1. Identity of the person conducting the drill.

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2. Date and time of the drill.
3. Notification method used.
4. Employees on duty and participating.
5. Number of occupants evacuated.
6. Special conditions simulated.
7. Problems encountered.
8. Weather conditions when occupants were evacuated.
9. Time required to accomplish complete evacuation.

405.7 Notification. Where required by the fire code official, prior notification of emergency evacuation drills shall be given to the fire code official.

405.8 Initiation. Where a fire alarm system is provided, emergency evacuation drills shall be initiated by activating the fire alarm system.

405.9 Accountability. As building occupants arrive at the assembly point, efforts shall be made to determine if all occupants have been successfully evacuated or have been accounted for.

Exception: In Group I-2 and ambulatory care facilities, the movement of care recipients to safe areas or to the exterior of the building is not required.

405.10 Recall and reentry. An electrically or mechanically operated signal used to recall occupants after an evacuation shall be separate and distinct from the signal used to initiate the evacuation. The recall signal initiation means shall be manually operated and under the control of the person in charge of the premises or the official in charge of the incident. Persons shall not reenter the premises until authorized to do so by the official in charge.

[California Code of Regulations, Title 19, Division 1, §3.13(c)(2) and (3)] Fire Drills. (Organized Camps)

(c) Organized Camps.

(2) Within 24 hours after arrival, every group of persons attending an organized camp shall be made familiar with the method by which the fire alarm may be activated and with the procedures to be followed upon notification of fire.

(3) At least 1 fire drill shall be held within 24 hours of the commencement of each camping session. Additional drills shall be conducted at least once each week thereafter. When sessions exceed a 7 day period, at least 1 drill shall be held during night-time sleeping hours.

SECTION 406—EMPLOYEE TRAINING AND RESPONSE PROCEDURES

406.1 General. Where fire safety and evacuation plans are required by Section 403, employees shall be trained in fire emergency procedures based on plans prepared in accordance with Section 404.

406.2 Frequency. Employees shall receive training in the contents of fire safety and evacuation plans and their duties as part of new employee orientation and not less than annually thereafter. Records of training shall be maintained.

406.3 Employee training program. Employees shall be trained in fire prevention, evacuation and fire safety in accordance with Sections 406.3.1 through 406.3.4.

406.3.1 Fire prevention training. Employees shall be apprised of the fire hazards of the materials and processes to which they are exposed. Each employee shall be instructed in the proper procedures for preventing fires in the conduct of their assigned duties.

406.3.2 Evacuation training. Employees shall be familiarized with the fire alarm and evacuation signals, their assigned duties in the event of an alarm or emergency, evacuation routes, areas of refuge, exterior assembly areas and procedures for evacuation.

406.3.3 Fire safety training. Employees assigned firefighting duties shall be trained to know the locations and proper use of portable fire extinguishers or other manual firefighting equipment and the protective clothing or equipment required for its safe and proper use.

406.3.4 Emergency lockdown training. Where a facility has a lockdown plan, employees shall be trained on their assigned duties and procedures in the event of an emergency lockdown.

SECTION 407—HAZARD COMMUNICATION

407.1 General. Where operating or closing a hazardous materials storage, use or handling facility subject to permits under Section 5001.5, or where required by the fire code official, the provisions of Sections 407.2 through 407.7 shall be applicable.

407.2 Safety Data Sheets. Safety Data Sheets (SDS) for all hazardous materials shall be either readily available on the premises as a paper copy, or where approved, shall be permitted to be readily retrievable by electronic access.

407.3 Identification. Individual containers of hazardous materials, cartons or packages shall be marked or labeled in accordance with applicable federal regulations. Buildings, rooms and spaces containing hazardous materials shall be identified by hazard warning signs in accordance with Section 5003.5.

407.4 Training. Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of a fire, leak or spill. Responsible persons shall be designated and trained to be liaison personnel for the fire department. These persons shall aid

the fire department in preplanning emergency responses and identification of where hazardous materials are located, and shall have access to Safety Data Sheets and be knowledgeable in the site emergency response procedures.

407.5 Hazardous Materials Inventory Statement. Where required by the fire code official, each application for a permit shall include a Hazardous Materials Inventory Statement (HMIS) in accordance with Section 5001.5.2.

407.6 Hazardous Materials Management Plan. Where required by the fire code official, each application for a permit shall include a Hazardous Materials Management Plan (HMMP) in accordance with Section 5001.5.1. The fire code official is authorized to accept a similar plan required by other regulations.

407.7 Facility closure plans. The permit holder or applicant shall submit to the fire code official a facility closure plan in accordance with Section 5001.6.3 to terminate storage, dispensing, handling or use of hazardous materials.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – FIRE SERVICE FEATURES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
503			†																				
[T-19 §3.05 (a)]				X																			
503.5.2			X																				
[T-19 §3.05 (b)]				X																			
504.4			X																				
507.2.1			X																				
507.3			X																				
507.5			X																				
507.5.1			X																				
507.5.3			X																				
508.1			X																				
508.1.2			X																				
508.1.5			X																				
508.1.6			X																				
508.1.8			X																				
510.2			†																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

5 FIRE SERVICE FEATURES

User notes:

About this chapter: Chapter 5 provides requirements that apply to all buildings and occupancies and pertain to access roads, access to building openings and roofs, premises identification, key boxes, fire protection water supplies, fire command centers, fire department access to equipment and emergency responder communications enhancement coverage in buildings. Although many safety features are part of the building design, features such as proper fire department access roads and communication coverage are necessary in case of emergency and are important tools for emergency responders for public safety and their own safety.

SECTION 501—GENERAL

501.1 Scope. Fire service features for buildings, structures and premises shall comply with this chapter.

501.2 Permits. A permit shall be required as set forth in Sections 105.5 and 105.6.

501.3 Construction documents. Construction documents for proposed fire apparatus access, location of fire lanes, security gates across fire apparatus access roads and construction documents and hydraulic calculations for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

501.3.1 Site safety plan. The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an approved written site safety plan in accordance with Section 3303.

501.4 Timing of installation. Where fire apparatus access roads or a water supply for fire protection are required to be installed, such protection shall be installed and made serviceable prior to and during the time of construction except where approved alternative methods of protection are provided. Temporary street signs shall be installed at each street intersection where construction of new roadways allows passage by vehicles in accordance with Section 505.2.

SECTION 502—DEFINITIONS

502.1 Definitions. The following terms are defined in Chapter 2:

AGENCY.

FIRE APPARATUS ACCESS ROAD.

FIRE COMMAND CENTER.

FIRE DEPARTMENT MASTER KEY.

FIRE LANE.

KEY BOX.

TRAFFIC CALMING DEVICES.

SECTION 503—FIRE APPARATUS ACCESS ROADS

503.1 Where required. Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

503.1.1 Buildings and facilities. Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior walls of the first story of the building as measured by an approved route around the exterior of the building or facility.

Exceptions:

1. The fire code official is authorized to increase the dimension of 150 feet (45 720 mm) where any of the following conditions occur:
   - 1.1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.
   - 1.2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, nonnegotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.
   - 1.3. There are not more than two Group R-3 or Group U occupancies.
2. Where approved by the fire code official, fire apparatus access roads shall be permitted to be exempted or modified for solar photovoltaic power generation facilities.

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503.1.2 Additional access. The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

503.1.3 High-piled storage. Fire department vehicle access to buildings used for high-piled combustible storage shall comply with the applicable provisions of Chapter 32.

503.2 Specifications. Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.8.

[California Code of Regulations, Title 19, Division 1, §3.05(a)] Fire Department Access and Egress. (Roads)

(a) Roads. Required access roads from every building to a public street shall be all-weather hard-surfaced (suitable for use by fire apparatus) right-of-way not less than 20 feet in width. Such right-of-way shall be unobstructed and maintained only as access to the public street.

***Exception:** The enforcing agency may waive or modify this requirement if in his opinion such all-weather hard-surfaced condition is not necessary in the interest of public safety and welfare.*

503.2.1 Dimensions. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

503.2.2 Authority. The fire code official shall have the authority to require or permit modifications to the required access widths where they are inadequate for fire or rescue operations or where necessary to meet the public safety objectives of the jurisdiction.

503.2.3 Surface. Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.

503.2.4 Turning radius. The required turning radius of a fire apparatus access road shall be determined by the fire code official.

503.2.5 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus.

503.2.6 Bridges and elevated surfaces. Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17. Bridges and elevated surfaces shall be designed for a live load sufficient to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges where required by the fire code official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces that are not designed for such use, approved barriers, approved signs or both shall be installed and maintained where required by the fire code official.

503.2.7 Grade. The grade of the fire apparatus access road shall be within the limits established by the fire code official based on the fire department's apparatus.

503.2.8 Angles of approach and departure. The angles of approach and departure for fire apparatus access roads shall be within the limits established by the fire code official based on the fire department's apparatus.

503.3 Marking. Where required by the fire code official, approved signs or other approved notices or markings that include the words "NO PARKING—FIRE LANE" shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. The means by which fire lanes are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

503.4 Obstruction of fire apparatus access roads. Fire apparatus access roads shall not be obstructed in any manner, including the parking of vehicles. The minimum widths and clearances established in Sections 503.2.1 and 503.2.2 shall be maintained at all times.

503.4.1 Traffic calming devices. Traffic calming devices shall be prohibited unless approved by the fire code official.

503.5 Required gates or barricades. The fire code official is authorized to require the installation and maintenance of gates or other approved barricades across fire apparatus access roads, trails or other accessways, not including public streets, alleys or highways. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

503.5.1 Secured gates and barricades. Where required, gates and barricades shall be secured in an approved manner. Roads, trails and other accessways that have been closed and obstructed in the manner prescribed by Section 503.5 shall not be trespassed on or used unless authorized by the owner and the fire code official.

Exception: The restriction on use shall not apply to public officers acting within the scope of duty.

***503.5.2 Fences and Gates.** School grounds may be fenced and gates therein may be equipped with locks, provided that safe dispersal areas based on 3 square feet (0.28 m^2) per occupant are located between the school and the fence. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from school buildings.*

Every public and private school shall conform with Section 32020 of the Education Code which states:

The governing board of every public school district, and the governing authority of every private school, which maintains any building used for the instruction or housing of school pupils on land entirely enclosed (except for building walls) by fences of walls, shall, through cooperation with the local law enforcement and fire-protection agencies having jurisdiction of the area, make provision for the erection of gates in such fences or walls. The gates shall be of sufficient size to permit the entrance of the ambulances, police equipment and firefighting apparatus used by the law

enforcement and fire-protection agencies. There shall be no less than one such access gate and there shall be as many such gates as needed to assure access to all major buildings and ground areas. If such gates are to be equipped with locks, the locking devices shall be designed to permit ready entrance by the use of the chain or bolt-cutting devices with which the local law enforcement and fire-protection agencies may be equipped.

503.6 Security gates. The installation of security gates across a fire apparatus access road shall be approved by the fire code official. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

SECTION 504—ACCESS TO BUILDING OPENINGS AND ROOFS

504.1 Required access. Exterior doors and openings required by this code or the *California Building Code* shall be maintained with ready access for emergency access by the fire department. An approved access walkway leading from fire apparatus access roads to exterior openings shall be provided where required by the fire code official.

[California Code of Regulations, Title 19, Division 1, §3.05(b)] Fire Department Access and Egress. (Roofs)

(b) Roofs. No person shall install or maintain any security barrier such as barbed wire fencing, razor wire fencing, chain link fencing or any other fencing material, cable, aerial, antenna or other obstruction on the roof of any commercial establishment in such a manner as to obstruct or render egress or access hazardous in the event of fire or other emergency.

***Exception:** Guy wire, rods and aerial antenna masts may be attached to a roof structure having a slope of less than 30 degrees provided there is full clearance of seven feet or more between the roof and said obstruction. Guy wire or rods required to support aerial or antenna masts may be attached to a roof structure a lateral distance from the mast not in excess of one-sixth the height of the mast.*

504.2 Maintenance of exterior doors and openings. Exterior doors and their function shall not be eliminated without prior approval. Exterior doors that have been rendered nonfunctional and that retain a functional door exterior appearance shall have a sign affixed to the exterior side of the door with the words "THIS DOOR BLOCKED." The sign shall consist of letters having a principal stroke of not less than $^{3}/_{4}$ inch (19.1 mm) wide and not less than 6 inches (152 mm) high on a contrasting background. Required fire department access doors shall not be obstructed or eliminated. Exit and exit access doors shall comply with Chapter 10. Access doors for high-piled combustible storage shall comply with Section 3206.7.

504.3 Stairway access to roof. New buildings four or more stories above grade plane, except those with a roof slope greater than 4 units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a stairway to the roof. Stairway access to the roof shall be in accordance with Section 1011.12. Such stairway shall be marked at street and floor levels with a sign indicating that the stairway continues to the roof. Where the roof is a vegetative roof, includes a landscaped roof area, or is used or for other purposes, stairways shall be provided as required for such occupancy classification.

***504.4 Roof access.** No person shall install or maintain any security barrier such as barbed wire fencing, razor wire fencing, chain link fencing or any other fencing material, cable, aerial, antenna or other obstruction on the roof of any commercial establishment in such a manner as to obstruct or render egress or access hazardous in the event of fire or other emergency.*

***Exception:** Guy wire, rods and aerial antenna masts may be attached to a roof structure having a slope of less than 30 degrees provided there is full clearance of 7 feet or more between the roof and said obstruction. Guy wire or rods required to support aerial or antenna masts may be attached to a roof structure a lateral distance from the mast not in excess of one-sixth the height of the mast.*

SECTION 505—PREMISES IDENTIFICATION

505.1 Address identification. New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 4 inches (102 mm) high with a minimum stroke width of $^{1}/_{2}$ inch (12.7 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address identification shall be maintained.

505.2 Street or road signs. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles. Signs shall be of an approved size, weather resistant and be maintained until replaced by permanent signs.

SECTION 506—KEY BOXES

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or firefighting purposes, the fire code official is authorized to require a key box to be installed in an approved location. The key box shall be of an approved type listed in accordance with UL 1037, and shall contain keys to gain necessary access as required by the fire code official.

506.1.1 Locks. An approved lock shall be installed on gates or similar barriers where required by the fire code official.

506.1.2 Key boxes for nonstandardized fire service elevator keys. Key boxes provided for nonstandardized fire service elevator keys shall comply with Section 506.1 and all of the following:

1. The key box shall be compatible with an existing rapid entry key box system in use in the jurisdiction and approved by the fire code official.
2. The front cover shall be permanently labeled with the words "FIRE DEPARTMENT USE ONLY—ELEVATOR KEYS."
3. The key box shall be mounted at each elevator bank at the lobby nearest to the lowest level of fire department access.
4. The key box shall be mounted 5 feet 6 inches (1676 mm) above the finished floor to the right side of the elevator bank.
5. Contents of the key box are limited to fire service elevator keys. Additional elevator access tools, keys and information pertinent to emergency planning or elevator access shall be permitted where authorized by the fire code official.
6. In buildings with two or more elevator banks, a single key box shall be permitted to be used where such elevator banks are separated by not more than 30 feet (9144 mm). Additional key boxes shall be provided for each individual elevator or elevator bank separated by more than 30 feet (9144 mm).

Exception: A single key box shall be permitted to be located adjacent to a fire command center or the nonstandard fire service elevator key shall be permitted to be secured in a key box used for other purposes and located in accordance with Section 506.1.

506.2 Key box maintenance. The operator of the building shall immediately notify the fire code official and provide the new key where a lock is changed or rekeyed. The key to such lock shall be secured in the key box.

SECTION 507—FIRE PROTECTION WATER SUPPLIES

507.1 Required water supply. An approved water supply capable of supplying the required fire flow for fire protection shall be provided to premises on which facilities, buildings or portions of buildings are hereafter constructed or moved into or within the jurisdiction.

507.2 Type of water supply. A water supply shall consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

507.2.1 Private fire service mains. Private fire service mains and appurtenances shall be installed in accordance with NFPA 24 *as amended in Chapter 80.*

507.2.2 Water tanks. Water tanks for private fire protection shall be installed in accordance with NFPA 22.

507.3 Fire flow. Fire-flow requirements for buildings or portions of buildings and facilities shall be determined by an approved method *or Appendix B.*

507.4 Water supply test. The fire code official shall be notified prior to the water supply test. Water supply tests shall be witnessed by the fire code official or approved documentation of the test shall be provided to the fire code official prior to final approval of the water supply system.

507.5 Fire hydrant systems. Fire hydrant systems shall comply with Sections 507.5.1 through 507.5.6 *and Appendix C or by an approved method.*

507.5.1 Where required. Where a portion of the facility or building hereafter constructed or moved into or within the jurisdiction is more than 400 feet (122 m) from a hydrant on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, on-site fire hydrants and mains shall be provided where required by the fire code official.

Exception: For Group R-3 and Group U occupancies, *equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3,* the distance requirement shall be *not more than* 600 feet (183 m).

507.5.1.1 Hydrant for standpipe systems. Buildings equipped with a standpipe system installed in accordance with Section 905 shall have a fire hydrant within 100 feet (30 480 mm) of the fire department connections.

Exception: The distance shall be permitted to exceed 100 feet (30 480 mm) where approved by the fire code official.

507.5.2 Inspection, testing and maintenance. Fire hydrant systems shall be subject to periodic tests as required by the fire code official. Fire hydrant systems shall be maintained in an operative condition at all times and shall be repaired where defective. Additions, repairs, alterations and servicing shall comply with approved standards. Records of tests and required maintenance shall be maintained.

507.5.3 Private fire service mains and water tanks. Private fire service mains and water tanks shall be periodically inspected, tested and maintained in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5.*

1. Private fire hydrants of all types: Inspection annually and after each operation; flow test and maintenance annually.
2. Fire service main piping: Inspection of exposed, annually; flow test every 5 years.
3. Fire service main piping strainers: Inspection and maintenance after each use.

Records of inspections, testing and maintenance shall be maintained.

507.5.4 Obstruction. Unobstructed access to fire hydrants shall be maintained at all times. The fire department shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants.

507.5.5 Clear space around hydrants. A 3-foot (914 mm) clear space shall be maintained around the circumference of fire hydrants, except as otherwise required or approved.

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507.5.6 Physical protection. Where fire hydrants are subject to impact by a motor vehicle, guard posts or other approved means shall comply with Section 312.

SECTION 508—FIRE COMMAND CENTER

508.1 General. Where required by other sections of this code and in all buildings classified as high-rise buildings by the *California Building Code and Group I-2 occupancies having occupied floors located more than 75 feet (23 m) above the lowest level of fire department vehicle access and in all F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 451 m^2),* a fire command center for fire department operations shall be provided and shall comply with Sections 508.1.1 through 508.1.7.

508.1.1 Location and access. The location and access to the fire command center shall be approved by the fire code official.

508.1.2 Separation. The fire command center shall be separated from the remainder of the building by not less than a 2-hour fire barrier constructed in accordance with Section 707 of the *California Building Code* or horizontal assembly constructed in accordance with Section 711 of the *California Building Code*, or both.

508.1.3 Size. The fire command center shall be not less than 0.015 percent of the total building area of the facility served or 200 square feet (19 m^2) in area, whichever is greater, with a minimum dimension of 0.7 times the square root of the room area or 10 feet (3048 mm), whichever is greater.

Where a fire command center is required for Group F-1 and S-1 occupancies with a building footprint greater than 500,000 square feet (46 452 m^2), the fire command center shall have a minimum size of 96 square feet (9 m^2) with a minimum dimension of 8 feet (2438 mm) where approved by the fire code official.

508.1.4 Layout approval. A layout of the fire command center and all features required by this section to be contained therein shall be submitted for approval prior to installation.

508.1.5 Storage. Storage unrelated to operation of the fire command center shall be prohibited. *Fire command centers shall not be used for the housing of any boiler, heating unit, generator, combustible storage or similar hazardous equipment or storage.*

508.1.6 Required features. The fire command center shall comply with NFPA 72 and shall contain the following features:

1. The emergency voice/alarm communications system control unit.
2. The fire department communications system.
3. *Fire alarm system zoning annunciator panel required by Section 907.6.4.3.*
4. Annunciator unit visually indicating the location of the elevators and whether they are operational.
5. Status indicators and controls for air distribution systems.
6. The firefighter's control panel required by Section 909.16 for smoke control systems installed in the building.
7. Controls for unlocking interior exit stairway doors simultaneously.
8. Sprinkler valve and water-flow detector display panels.
9. Emergency and standby power status indicators.
10. A telephone for fire department use with controlled access to the public telephone system.
11. Fire pump status indicators.
12. Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems, firefighter air-replenishment systems, firefighting equipment and fire department access, and the location of fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions.
13. An approved Building Information Card that includes, but is not limited to, all of the following information:
    - 13.1. General building information that includes: property name, address, the number of floors in the building above and below grade, use and occupancy classification (for mixed uses, identify the different types of occupancies on each floor) and the estimated building population during the day, night and weekend.
    - 13.2. Building emergency contact information that includes: a list of the building's emergency contacts including but not limited to building manager, building engineer and their respective work phone number, cell phone number and email address.
    - 13.3. Building construction information that includes: the type of building construction including but not limited to floors, walls, columns and roof assembly.
    - 13.4. Exit access stairway and exit stairway information that includes: number of exit access stairways and exit stairways in building; each exit access stairway and exit stairway designation and floors served; location where each exit access stairway and exit stairway discharges, interior exit stairways that are pressurized; exit stairways provided with emergency lighting; each exit stairway that allows reentry; exit stairways providing roof access; elevator information that includes: number of elevator banks, elevator bank designation, elevator car numbers and respective floors that they serve; location of elevator machine rooms, control rooms and control spaces; location of sky lobby; and location of freight elevator banks.
    - 13.5. Building services and system information that includes: location of mechanical rooms, location of building management system, location and capacity of all fuel oil tanks, location of emergency generator and location of natural gas service.

13.6. Fire protection system information that includes: location of standpipes, location of fire pump room, location of fire department connections, floors protected by automatic sprinklers and location of different types of automatic sprinkler systems installed including but not limited to dry, wet and pre-action.

13.7. Hazardous material information that includes: location and quantity of hazardous material.

14. Work table.
15. Generator supervision devices, manual start and transfer features.
16. Public address system, where specifically required by other sections of this code.
17. Elevator fire recall switch in accordance with ASME A17.1/CSA B44.
18. Elevator emergency or standby power selector switch(es) in accordance with ASME A17.1/CSA B44.
19. *A master switch for unlocking elevator lobby doors permitted by Section 1010.2.12.1.*

508.1.7 Fire command center identification. The fire command center shall be identified by a permanent, easily visible sign stating "FIRE COMMAND CENTER" located on the door to the fire command center.

508.1.8 Ventilation. *The fire command center shall be provided with an independent ventilation or air-conditioning system.*

SECTION 509—FIRE PROTECTION AND UTILITY EQUIPMENT IDENTIFICATION AND ACCESS

509.1 Identification. Fire protection equipment shall be identified in an approved manner. Rooms containing controls for air-conditioning systems or fire protection systems shall be identified for the use of the fire department. Approved signs required to identify fire protection system equipment and equipment location shall be constructed of durable materials, permanently installed and readily visible.

509.1.1 Utility identification. Where required by the fire code official, gas shutoff valves, electric meters, service switches and other utility equipment shall be clearly and legibly marked to identify the unit or space that it serves. Identification shall be made in an approved manner, readily visible and shall be maintained.

509.2 Equipment access. Approved access shall be provided and maintained for all fire protection system equipment to permit immediate safe operation and maintenance of such equipment. Storage, trash and other materials or objects shall not be placed or kept in such a manner that would prevent such equipment from ready access.

SECTION 510—EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEMS

510.1 Emergency responder communications enhancement systems in new buildings. Approved in-building emergency responder communications enhancement system (ERCES) for emergency responders shall be provided in all new buildings. In-building ERCES within the building shall be based on the existing coverage levels of the public safety communications systems utilized by the jurisdiction, measured at the exterior of the building. The ERCES, where required, shall be of a type determined by the fire code official and the frequency license holder(s). This section shall not require improvement of the existing public safety communications systems.

Exceptions:

1. Where approved by the building official and the fire code official, a wired communications system in accordance with Section 907.2.13.2 shall be permitted to be installed or maintained instead of an approved communications coverage system.
2. Where it is determined by the fire code official that the communications coverage system is not needed.
3. In facilities where emergency responder communications coverage is required and such systems, components or equipment required could have a negative impact on the normal operations of that facility, the fire code official shall have the authority to accept an automatically activated emergency responder communications coverage system.
4. One-story buildings not exceeding 12,000 square feet (1115 m^2) with no below-ground area(s).

510.2 Emergency responder communications enhancement system in existing buildings. Existing buildings shall be provided with approved in-building emergency responder communications enhancement system for emergency responders as required in Chapter 11.

510.3 Permits. Permits for in-building emergency responder communications enhancement systems shall be in accordance with Sections 510.3.1 and 510.3.2.

510.3.1 Permit required. A construction permit for the installation of or modification to in-building emergency responder communications enhancement systems and related equipment is required as specified in Section 105.6.5. Maintenance performed in accordance with this code is not considered a modification and does not require a permit.

510.3.2 Operational permit. Where required by the fire code official, an operational permit shall be issued for the operation of an in-building emergency responder communications enhancement system.

510.4 Technical requirements. Equipment required to provide in-building emergency responder communications enhancement shall be listed in accordance with UL 2524. Systems, components and equipment required to provide the in-building emergency responder communications enhancement system shall comply with Sections 510.4.1 through 510.4.2.8.

510.4.1 Emergency responder communications enhancement system signal strength. The building shall be considered to have an acceptable in-building emergency responder communications enhancement system where signal strength measure-

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ments in 95 percent of all areas and 99 percent of areas designated as critical areas by the fire code official on each floor of the building meet the signal strength requirements in Sections 510.4.1.1 through 510.4.1.3.

510.4.1.1 Minimum signal strength into the building. The minimum downlink signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The downlink signal level shall be sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 throughout the coverage area using either narrowband analog, digital or wideband LTE signals or an equivalent bit error rate (BER), or signal-to-interference-plus-noise ratio (SINR) applicable to the technology for either analog or digital signals.

510.4.1.2 Minimum signal strength out of the building. The minimum uplink signal strength shall be sufficient to provide usable voice communications throughout the coverage area as specified by the fire code official. The uplink signal level shall be sufficient to provide not less than a delivered audio quality (DAQ) of 3.0 using either narrowband analog, digital or wideband LTE digital signals or an equivalent bit error rate (BER), or an equivalent SINR applicable to the technology for either analog or digital signals.

510.4.1.3 System performance. Signal strength shall be sufficient to meet the requirements of the applications being utilized by public safety for emergency operations through the coverage area as specified by the fire code official in Section 510.4.2.2.

510.4.2 System design. The in-building emergency responder communications enhancement system shall be designed in accordance with Sections 510.4.2.1 through 510.4.2.9 and NFPA 1225.

510.4.2.1 Amplification systems and components. Buildings and structures that cannot support the required level of in-building emergency responder communications enhancement system shall be equipped with systems and components to enhance the radio signals and achieve the required level of in-building emergency responder communications enhancement system specified in Sections 510.4.1 through 510.4.1.3. In-building emergency responder communications enhancement systems utilizing radio-frequency-emitting devices and cabling shall be approved by the fire code official. Prior to installation, all RF-emitting devices shall have the certification of the radio licensing authority and be suitable for public safety use.

510.4.2.2 Technical criteria. The fire code official shall maintain a document providing the specific technical information and requirements for the in-building emergency responder communications enhancement system. This document shall contain, but not be limited to, the various frequencies required, the location of radio sites, the effective radiated power of radio sites, the maximum propagation delay in microseconds, the applications being used and other supporting technical information necessary for system design.

510.4.2.3 Standby power. In-building emergency responder communications enhancement systems shall be provided with dedicated standby batteries or provided with 2-hour standby batteries and connected to the facility generator power system in accordance with Section 1203. The standby power supply shall be capable of operating the in-building emergency responder communications enhancement system at 100-percent system capacity for a duration of not less than 12 hours.

510.4.2.4 Signal booster requirements. If used, signal boosters shall meet the following requirements:

1. All signal booster components shall be contained in a NEMA Type 4 cabinet.
2. Battery systems used for the emergency power source shall be contained in a NEMA 3R or higher-rated cabinet.
3. Equipment shall have FCC or other radio licensing authority certification and be suitable for public safety use prior to installation.
4. Where a donor antenna exists, isolation shall be maintained between the donor antenna and all inside antennas to not less than 20dB greater than the system gain under all operating conditions.
5. Active RF-emitting devices used for in-building emergency responder communications enhancement systems shall have built-in oscillation detection and control circuitry to reduce gain and maintain operation. When a signal booster detects oscillation, a supervisory signal shall be transmitted. In the event of uncorrectable oscillation, the system shall be permitted to shut down.
6. The installation of amplification systems or systems that operate on or provide the means to cause interference on any in-building emergency responder communications enhancement network shall be coordinated and approved by the fire code official and the frequency license holder(s).

510.4.2.5 System monitoring. The in-building emergency responder communications enhancement system shall be monitored by a listed fire alarm control unit, or where approved by the fire code official, shall sound an audible signal at a constantly attended on-site location. Automatic supervisory signals shall include the following:

1. Loss of normal AC power supply.
2. System battery charger(s) failure.
3. Signal source malfunction.
4. Failure of active RF-emitting device(s).
5. Low-battery capacity at 70 percent of the 12-hour operating capacity has been depleted.
6. Failure of critical system components.
7. The communications link between the fire alarm system and the in-building emergency responder communications enhancement system.
8. Oscillation of active RF-emitting device(s).

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510.4.2.5.1 Single supervisory input. Where approved, a single supervisory input to the fire alarm system to monitor all system supervisory signals shall be permitted.

510.4.2.6 Additional frequencies and change of frequencies. The in-building emergency responder communications enhancement system shall be capable of modification or expansion in the event frequency changes are required by the FCC or other frequency licensing authorities, or additional frequencies are made available by the FCC or other frequency licensing authorities.

510.4.2.7 Design documents. The fire code official shall have the authority to require "as-built" design documents and specifications for in-building emergency responder communications enhancement systems. The documents shall be in a format acceptable to the fire code official.

510.4.2.8 Near-far effect. Where a signal booster is required by the RF system designer, the dynamic range of the in-building emergency responder communications enhancement system shall be designed to minimize the effects of strong signal automatic gain control on weak signal uplink performance.

510.4.2.9 Noise interference. Where a signal booster is used, signal booster type(s) and the uplink signal and noise levels shall be coordinated with and approved by all frequency license holder(s) that may be adversely impacted by any transmitted noise resulting from the in-building emergency responder communications enhancement system. Systems shall be in compliance with all frequency licensing authority requirements.

510.5 Installation requirements. The installation of the in-building emergency responder communications enhancement system shall be in accordance with NFPA 1225 and Sections 510.5.2 through 510.5.5.

510.5.1 Mounting of the donor antenna(s). To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed on the building or where approved, mounted on a movable sled with a clearly visible sign stating "MOVEMENT OR REPOSITIONING OF THIS ANTENNA IS PROHIBITED WITHOUT APPROVAL FROM THE FIRE CODE OFFICIAL." The antenna installation shall be in accordance with the applicable requirements in the *California Building Code* for weather protection of the building envelope.

510.5.2 Approval prior to installation. Communications enhancement systems capable of operating on frequencies licensed to any public safety agency by the FCC or other frequency licensing authority shall not be installed without prior coordination and approval of the fire code official and frequency license holder.

510.5.2.1 Active RF-emitting devices. Active RF-emitting devices shall meet the following requirements in addition to any other requirements determined by the fire code official or the frequency license holder(s):

1. Active RF-emitting devices that have a transmitted power output sufficient to require certification of the frequency licensing authority shall have the certification of the radio frequency licensing authority prior to installation.
2. All active RF-emitting devices shall be simultaneously compatible for their intended use, as required by the frequency licensing authority, the frequency license holder(s) and the fire code official, at the time of installation.
3. Written authorization shall be obtained from the frequency license holder(s) prior to the initial activation of any RF-emitting devices required to be certified by the frequency licensing authority.

510.5.3 Minimum qualifications of personnel. The minimum qualifications of the system designer and lead installation personnel shall include both of the following:

1. A valid FCC-issued general radio operators license.
2. Certification of in-building system training issued by an approved organization or approved school, or a certificate issued by the manufacturer of the equipment being installed.

These qualifications shall not be required where demonstration of adequate skills and experience satisfactory to the fire code official is provided.

510.5.4 Acceptance test procedure. Where an in-building emergency responder communications enhancement system is required, and upon completion of installation, the building owner shall have the radio system tested to verify that two-way coverage on each floor of the building is not less than 95 percent. The test procedure shall be conducted as follows or by a method approved by the fire code official:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.
2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system or equipment approved by the fire code official.
3. Failure of more than one test area shall result in failure of the test.
4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test, the system shall be altered to meet the 95-percent coverage requirement.
5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.

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6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.
7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.
8. Systems shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.

510.5.5 FCC compliance. The in-building emergency responder communications enhancement system installation and components shall comply with all applicable federal regulations including, but not limited to, FCC 47 CFR Part 90.219.

510.6 Maintenance. The in-building emergency responder communications enhancement system shall be maintained operational at all times in accordance with Sections 510.6.1 through 510.6.4.

510.6.1 Testing and proof of compliance. The owner of the building or *owner*'s authorized agent shall have the in-building emergency responder communications enhancement system inspected and tested annually or where structural changes occur, including additions or remodels that could materially change the original field performance tests. Testing shall consist of the following:

1. In-building coverage test as described in Section 510.5.4.
2. Signal boosters shall be tested to verify that the gain is the same as it was upon initial installation and acceptance or set to optimize the performance of the system.
3. Backup batteries and power supplies shall be tested under load of a period of 1 hour to verify that they will properly operate during an actual power outage. If within the 1-hour test period the battery exhibits symptoms of failure, the test shall be extended for additional 1-hour periods until the integrity of the battery can be determined.
4. All active components shall be checked to verify operation within the manufacturer's specifications.

At the conclusion of the testing, a report, which shall verify compliance with Section 510.5.4, shall be submitted to the fire code official.

510.6.2 Additional frequencies. The building owner shall modify or expand the in-building emergency responder communications enhancement system at their expense in the event frequency changes are required by the FCC or other radio licensing authority, or additional frequencies are made available by the FCC or other radio licensing authority. Prior approval of an in-building emergency responder communications enhancement system on previous frequencies does not exempt this section.

510.6.3 Nonpublic safety system. Where other nonpublic safety amplification systems installed in buildings reduce the performance or cause interference with the in-building emergency responder communications enhancement system, the nonpublic safety amplification system shall be corrected or removed.

510.6.4 Field testing. Agency personnel shall have the right to enter onto the property at any reasonable time to conduct field testing to verify the required level of radio coverage.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 6 – BUILDING SERVICES AND SYSTEMS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						CSA	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
603.1.2			X																				
603.5.1.1			X																				
604.2			X																				
604.3			X																				
604.3.4 – *604.3.5*			X																				
604.6.3 – 604.6.4.4			X																				
605.4			X																				
605.4.1			X																				
605.4.2.3			X																				
605.4.2.5			X																				
605.4.3			X																				
[T-19 §3.17 (a)(b)]				X																			
605.5.2			X																				
605.7			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

6 BUILDING SERVICES AND SYSTEMS

User notes:

About this chapter: Chapter 6 focuses on building systems and services as they relate to potential safety hazards and when and how they should be installed. This chapter brings together all building system- and service-related issues for convenience and provides a more systematic view of buildings. The following building services and systems are addressed: electrical equipment wiring and hazards, elevator operation, maintenance and fire service keys, fuel-fired appliances, commercial cooking equipment and systems, commercial cooking oil storage, mechanical refrigeration, hyperbaric facilities and clothes dryer exhaust systems. Note that building systems focused on energy systems and components are addressed by Chapter 12.

SECTION 601—GENERAL

601.1 Scope. The provisions of this chapter shall apply to the installation, operation, testing and maintenance of the following building services and systems:

1. Electrical systems, equipment and wiring.
2. Information technology server rooms.
3. Elevator systems, emergency operation and recall.
4. Fuel-fired appliances, heating systems, chimneys and fuel oil storage.
5. Commercial cooking equipment and systems.
6. Commercial cooking oil storage.
7. Mechanical refrigeration systems.
8. Hyperbaric facilities.
9. Clothes dryer exhaust systems.

601.2 Hazard abatement. Operations or conditions deemed unsafe or hazardous by the fire code official shall be abated. Equipment, appliances, materials and systems that are modified or damaged and constitute an electrical shock or fire hazard shall not be used.

601.2.1 Correction of unsafe conditions. The fire code official shall be authorized to require the owner, the owner's authorized agent, operator or occupant of a building or premises to abate or cause to be abated or corrected such unsafe operations or conditions either by repair, rehabilitation, demolition or other approved corrective action in compliance with this code.

SECTION 602—DEFINITIONS

602.1 Definitions. The following terms are defined in Chapter 2:

COMMERCIAL COOKING APPLIANCES.

HOOD.

Type I.

REFRIGERANT.

REFRIGERATING (REFRIGERATION) SYSTEM.

SECTION 603—ELECTRICAL EQUIPMENT, WIRING AND HAZARDS

603.1 General. Electrical equipment, wiring and systems required by this code or the *California Building Code* shall be installed, used and maintained in accordance with *the California Electrical Code* and Sections 603.2 through 603.9.

603.1.1 Equipment and wiring. All electrical equipment, wiring, devices and appliances shall be tested; listed and labeled; and installed, used and maintained in accordance with *the California Electrical Code* and all instructions included as part of such listing.

603.1.2 Healthcare facilities. In Group I-2 facilities, ambulatory care facilities and outpatient clinics, the electrical systems and equipment shall be maintained and tested in accordance with NFPA 99 *and Article 517 of the California Electrical Code.*

603.2 Abatement of unsafe conditions and electrical hazards. Conditions that constitute an electrical shock or fire hazard shall be abated.

603.2.1 Modified or damaged. Electrical wiring, devices, equipment and appliances that are modified or damaged, and constitute an electrical shock or fire hazard, shall not be used until repaired or replaced in accordance with this code and *the California Electrical Code*.

603.2.2 Open electrical terminations. Open junction boxes and open-wiring splices shall be prohibited. Approved covers shall be provided for all switch and electrical outlet boxes.

603.3 Illumination. Illumination shall be provided for service equipment areas, motor control centers and electrical panelboards.

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603.4 Working space and clearances. Working space around electrical equipment shall be provided in accordance with Section 110.26 of *the California Electrical Code* for electrical equipment rated 1,000 volts or less, and Section 110.32 of *the California Electrical Code* for electrical equipment rated over 1,000 volts. The minimum required working space shall be not less than 30 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height in front of electrical service equipment. Where the electrical service equipment is wider than 30 inches (762 mm), the minimum working space shall be not less than the width of the equipment. Storage of materials shall not be located within the designated working space.

603.4.1 Electrical room marking. Doors into electrical control panel rooms shall be marked with a plainly visible and legible sign stating "ELECTRICAL ROOM" or similar approved wording.

603.4.2 Disconnect means marking. The disconnecting means for each service, feeder or branch circuit originating on a switchboard or panelboard shall be legibly and durably marked to indicate its purpose unless such purpose is clearly evident.

603.4.3 Multiple supply connections marking. Where buildings or structures are supplied by more than one power source, markings shall be provided at each service equipment location and at all interconnected electric power production sources identifying all electric power sources at the premises in accordance with *the California Electrical Code*.

603.5 Relocatable power taps and current taps. The construction and use of current taps and relocatable power taps shall be in accordance with *the California Electrical Code* and this code.

603.5.1 Listing. Relocatable power taps shall be listed and labeled in accordance with UL 1363. Current taps shall be listed and labeled in accordance with UL 498A.

603.5.1.1 Listing in Group I-2 occupancies and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, relocatable power taps shall be listed and labeled in accordance with UL 1363 except under the following conditions:

➡ 1. In Group I-2 occupancies, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed and labeled in accordance with UL 1363A or UL 60601-1.

➡ 2. In Group I-2 facilities, in care recipient rooms using line-operated patient care-related electrical equipment, relocatable power taps in the patient care vicinity, as defined by NFPA 99, shall be listed and labeled in accordance with UL 1363A or UL 60601-1.

3. In ambulatory care facilities, relocatable power taps providing power to patient care-related electrical equipment in the patient care vicinity, as defined by NFPA 99, shall be listed and labeled in accordance with UL 1363A or UL 60601-1.

603.5.2 Application and use. Relocatable power taps and current taps shall be directly connected to a permanently installed receptacle.

Exceptions:

1. Where approved for use in a Group A occupancy or in a meeting room in a Group B occupancy, not more than five relocatable power taps shall be permitted to be connected together or connected to an extension cord for temporary use to supply power to electronic equipment.
2. Current taps and relocatable power taps shall not be required to connect directly to a permanently installed receptacle outlet where used for 90 days or less for the purpose of testing the performance of such devices.

603.5.3 Installation. Relocatable power tap cords shall not extend through walls, ceilings, floors, under doors or floor coverings, or be subject to environmental or physical damage.

603.6 Extension cords. Extension cords shall not be a substitute for permanent wiring and shall be listed and labeled in accordance with UL 817. Extension cords shall not be affixed to structures, extended through walls, ceilings or floors, or under doors or floor coverings, nor shall such cords be subject to environmental damage or physical impact. Extension cords shall be used only with portable appliances. Extension cords marked for indoor use shall not be used outdoors.

603.6.1 Application and use. Extension cords shall be plugged directly into an approved receptacle, relocatable power tap or current tap and, except for approved multiplug extension cords, shall serve only one portable appliance.

603.6.2 Ampacity. The ampacity of the extension cords shall be not less than the rated ampacity of the portable appliance supplied by the cord.

603.6.3 Maintenance. Extension cords shall be maintained in good condition without splices, deterioration or damage.

➡ **603.6.4 Grounding.** Extension cords shall contain an equipment grounding conductor where serving portable appliances required to be connected to an equipment grounding conductor.

603.7 Electrical motors. Electrical motors shall be maintained free from excessive accumulations of oil, dirt, waste and debris.

603.8 Temporary wiring. The use of temporary wiring for electrical power and lighting installations shall not exceed a period of 90 days. Temporary wiring methods shall meet the applicable provisions of *the California Electrical Code*.

Exception: Temporary wiring for electrical power and lighting installations complying with the applicable provisions of *the California Electrical Code* is permitted during periods of construction, remodeling, repair or demolition of buildings, structures, equipment or similar activities.

603.8.1 Attachment to structures. Temporary wiring attached to a structure shall be protected from physical damage and supported on insulators spaced not more than 10 feet (3048 mm) apart.

603.9 Abandoned wiring in plenums. Abandoned cables in plenums that are able to be accessed without causing damage, or requiring demolition to the building, shall be tagged for future use or shall be removed.

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SECTION 604—ELEVATOR OPERATION, MAINTENANCE AND FIRE SERVICE KEYS

604.1 General. Where elevators and conveying systems are installed, they shall comply with Chapter 30 of the *California Building Code* and Sections 604.2 through 604.7 of this code.

604.2 Emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more shall comply with the requirements in Chapter 11. New elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

604.3 Standby power. In buildings and structures where standby power is required or furnished to operate an elevator, standby power shall be provided in accordance with Section 1203 *of this code and Chapter 30 of the California Building Code*. Operation of the system shall be in accordance with Sections 604.3.1 through *604.3.5.*

604.3.1 Manual transfer. Standby power shall be manually transferable to all elevators in each bank.

604.3.2 One elevator. Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.

604.3.3 Two or more elevators. Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, not less than one elevator shall remain operable from the standby power source.

604.3.4 ***Temperature and humidity control.*** Where standby power is connected to elevators, the machine room*, machine space, control room and control space* ventilation or air conditioning shall be connected to the standby power source.

604.3.5 Emergency hoistway venting. *Where standby power is connected to elevators, the emergency hoistway ventilation system, if required, shall be connected to the standby power source.*

[BE] 604.4 Emergency signs. An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. Where elevators are not a component of the accessible means of egress, the sign shall read: "IN CASE OF FIRE, ELEVATORS ARE OUT OF SERVICE. USE EXIT."

Exception: The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008 of the *California Building Code*.

604.5 Maintenance of elevators. Elevator features and lobbies required by Section 3006 of the *California Building Code* shall be inspected, tested and maintained in accordance with Sections 604.5.1 through 604.5.4.

604.5.1 Fire service access elevators and lobbies. Where fire service access elevators are required by Section 3007 of the *California Building Code*, fire service access elevator fire protection and safety features shall be maintained and lobbies required by Section 3007 of the *California Building Code* shall be maintained free of storage and furniture.

604.5.2 Occupant evacuation elevators and lobbies. Where occupant evacuation elevators are provided in accordance with Section 3008 of the *California Building Code*, occupant evacuation elevator fire protection and safety features shall be maintained and lobbies required by Section 3008 of the *California Building Code* shall be maintained free of storage and furniture.

604.5.3 Storage within elevator lobbies. Where hoistway opening protection is required by Section 3006.2 of the *California Building Code*, elevator lobbies shall be maintained free of storage.

604.5.4 Water protection of hoistway enclosures. Methods to prevent water from infiltrating into a hoistway enclosure required by Sections 3007.3 and 3008.3 of the *California Building Code* shall be maintained.

604.6 Elevator keys. All elevators shall be provided with elevator car door and firefighter service keys in accordance with Sections 604.6.1 through 604.6.2.4.

604.6.1 Elevator key location. Keys for the elevator car doors and firefighter service keys shall be kept in an approved location for immediate use by the fire department.

604.6.2 Standardized fire service elevator keys. Buildings with elevators equipped with Phase I emergency recall, Phase II emergency in-car operation, or a fire service access elevator shall be equipped to operate with a standardized fire service elevator key approved by the fire code official or a standardized key in accordance with ASME A17.1/CSA B44.

Exception: The owner shall be permitted to place the building's nonstandardized fire service elevator keys in a key box installed in accordance with Section 506.1.2.

604.6.2.1 Requirements for standardized fire service elevator keys. Standardized fire service elevator keys shall comply with all of the following:

1. All fire service elevator keys within the jurisdiction shall be uniform and approved in accordance with Section 604.6.2. Keys shall be cut to a uniform key code.
2. Fire service elevator keys shall be of a patent-protected design to prevent unauthorized duplication.
3. Fire service elevator keys shall be factory restricted by the manufacturer to prevent the unauthorized distribution of key blanks. Uncut key blanks shall not be permitted to leave the factory.
4. Fire service elevator keys subject to these rules shall be engraved with the words "DO NOT DUPLICATE."

604.6.2.2 Access to standardized fire service keys. Access to standardized fire service elevator keys shall be restricted to the following:

1. Elevator owners or their authorized agents.
2. Elevator contractors.
3. Elevator inspectors of the jurisdiction.
4. Fire code officials of the jurisdiction.
5. The fire department and other emergency response agencies designated by the fire code official.

604.6.2.3 Duplication or distribution of keys. A person shall not duplicate a standardized fire service elevator key or issue, give, or sell a duplicated key unless in accordance with this code.

604.6.2.4 Responsibility to provide keys. The building owner shall provide up to three standardized fire service elevator keys where required by the fire code official, upon installation of a standardized fire service key switch or switches in the building.

604.6.3 Shunt trip. *Where elevator hoistways or elevator machine rooms containing elevator control equipment are protected with automatic sprinklers, a means installed in accordance with NFPA 72, Section 21.4, Elevator Shutdown, shall be provided to automatically disconnect the main line power supply to the affected elevator prior to the application of water. This means shall not be self-resetting. The activation of sprinklers outside the hoistway or machine room shall not disconnect the main line power supply.*

604.6.4 Emergency hoistway venting. *Elevator hoistways containing the driving machine shall be provided with a means for venting smoke and hot gases to the outer air in case of fire.*

604.6.4.1 Location of vents. *Vents shall be located at the top of the hoistway and shall open either directly to the outer air or through noncombustible ducts to the outer air.*

604.6.4.2 Area of vents. *Except as provided for in Section 3003.1.4.4 of the California Building Code, the area of the vents shall be not less than 3½ percent of the area of the hoistway nor less than 3 square feet (0.28 m^2) for each elevator car.*

604.6.4.3 Operation of vents. *Vent openings shall automatically open upon detection of smoke in the elevator hoistway and upon activation of a manual override control. The manual override control shall be capable of opening and closing the vents and shall be located in an approved location. Smoke detectors provided in elevator hoistways to activate the hoistway ventilation system, shall also be required to activate the elevator Phase I emergency recall operation function in accordance with California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

604.6.4.4 Reduced vent area. *Where mechanical ventilation conforming to the California Mechanical Code is provided, a reduction in the required vent area is allowed provided that all of the following conditions are met:*

1. *The vents required by Section 3003.1.4.1 of the California Building Code do not have outside exposure.*
2. *The hoistway does not extend to the top of the building.*
3. *The hoistway exhaust fan is automatically reactivated by thermostatic means.*
4. *Equivalent venting of the hoistway is accomplished.*

604.7 Storage. Storage is prohibited in elevator cars or elevator machine rooms.

Exceptions:

1. Blankets used for protection of elevator cab walls during construction or renovation.
2. Materials necessary for the operation and maintenance of the elevator equipment.

SECTION 605—FUEL-FIRED APPLIANCES

605.1 General. The design, construction, installation, operation, alteration, repair and maintenance of nonportable gas-fired appliances and systems shall comply with *California Plumbing Code*. The design, construction, installation, operation, alteration, repair and maintenance of nonportable solid fuel-fired and oil-fired appliances and systems shall comply with the provisions of this section and the *California Mechanical Code*.

605.1.1 Installation of nonportable fuel-fired appliances. The installation of nonportable fuel-fired appliances shall be made in accordance with the manufacturer's installation instructions and applicable federal, state and local rules and regulations.

605.1.2 Electrical wiring and equipment. Electrical wiring and equipment used in connection with fuel-fired appliances and equipment shall be installed and maintained in accordance with Section 603 and *the California Electrical Code.*

605.1.3 Fuel oil. The grade of fuel oil used in an oil burner shall be that for which the oil burner is approved and as stipulated by the oil burner manufacturer's instructions. Oil containing gasoline shall not be used. Waste crankcase oil shall be an acceptable fuel in Group F, M and S occupancies where utilized in equipment listed and labeled for use with waste oil and where such equipment is installed in accordance with the manufacturer's instructions and the terms of its listing.

605.1.4 Access. The installation of fuel-fired equipment shall be provided with access to equipment for cleaning hot surfaces; removing burners; replacing motors, controls, air filters, chimney and vent connectors, draft regulators and other working parts; and for adjusting, cleaning and lubricating parts.

605.1.5 Testing, diagrams and instructions. After installation of the fuel-fired equipment, operation and combustion performance tests shall be conducted to determine that the equipment is in proper operating condition and that all accessory equipment, controls, and safety devices function properly.

605.1.5.1 Diagrams. Contractors installing industrial oil-burning systems shall furnish not less than two copies of diagrams showing the main oil lines and controlling valves, one copy of which shall be posted at the oil-burning equipment and another at an approved location that will be available in case of emergency.

605.1.5.2 Operating instructions. After completing the installation, the installer shall instruct the owner or operator in the proper operation of the equipment. The installer shall furnish the owner or operator with the manufacturer's operating instructions.

605.1.6 Clearances. Working clearances between fuel-fired appliances and electrical panelboards and equipment shall be in accordance with *the California Electrical Code*. Clearances between oil-fired equipment and oil supply tanks shall be in accordance with *the California Electrical Code*.

605.2 Abatement of unsafe conditions. The fire code official is authorized to order that measures be taken to prevent the operation of any existing stove, oven, furnace, incinerator, boiler or any other heat-producing device or appliance found to be defective or in violation of code requirements for existing appliances after giving notice to this effect to any person, owner, firm or agent or operator in charge of the same. The fire code official is authorized to take measures to prevent the operation of any device or appliance without notice when inspection shows the existence of an immediate fire hazard or when imperiling human life. The defective device shall remain withdrawn from service until all necessary repairs or alterations have been made or replaced in accordance with Section 605.1.

605.2.1 Chimneys and appliances. Chimneys, vents, incinerators, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the appliances such as stoves, furnaces, fireboxes or boilers to which such devices are connected, shall be maintained so as not to create a fire hazard.

605.2.1.1 Masonry chimneys. Masonry chimneys that, upon inspection, are found to be without a flue liner and that have open mortar joints which will permit smoke or gases to be discharged into the building, or which are cracked as to be dangerous, shall be repaired or relined with a listed chimney liner system installed in accordance with the manufacturer's instructions and the *California Mechanical Code* or a flue lining system installed in accordance with the requirements of the *California Building Code* and appropriate for the intended class of chimney service.

605.2.1.2 Metal chimneys. Metal chimneys that are corroded or improperly supported shall be repaired or replaced in accordance with the *California Mechanical Code*.

605.2.1.3 Decorative shrouds. Decorative shrouds installed at the termination of factory-built chimneys or vents shall be removed except where such shrouds are listed and labeled for use with the specific factory-built chimney system and are installed in accordance with the chimney or vent manufacturer's instructions and the *California Mechanical Code* or *International Fuel Gas Code*.

605.2.1.4 Factory-built chimney and vent systems. Existing factory-built chimneys and vent systems that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the *California Mechanical Code*.

605.2.1.5 Connectors. Existing chimney and vent connectors that are damaged, corroded or improperly supported shall be repaired or replaced in accordance with the *California Mechanical Code*.

605.3 Chimneys and vents. Masonry chimneys shall be constructed in accordance with the *California Building Code*. Factory-built chimneys and vent systems serving solid-fuel-fired appliances or oil-fired appliances shall be installed in accordance with the *California Mechanical Code*. Metal chimneys shall be constructed and installed in accordance with the *California Mechanical Code*. Factory-built chimneys and vent systems serving gas-fired appliances shall be installed in accordance with the *International Fuel Gas Code*.

605.4 Fuel oil storage systems. Fuel oil storage systems for *combustion engines and gas turbines* shall be installed and maintained in accordance with this code. Tanks and fuel oil piping systems *for building heating systems* shall be installed in accordance with *this section and NFPA 31. Tanks and fuel oil piping systems for generators and fire pumps shall be installed in accordance with Section 605.4.2 or Chapter 57.*

605.4.1 Fuel oil storage in outside, above-ground tanks. Where connected to a fuel oil piping system, the maximum amount of fuel oil storage allowed outside above ground without additional protection shall be 660 gallons (2498 L). The storage of fuel oil above ground *for building heating systems* in quantities exceeding 660 gallons (2498 L) shall comply with NFPA 31. *The storage of fuel oil above ground for combustion engines and gas turbines in portable tanks exceeding a capacity of 660 gallons (2498 L) shall comply with Chapter 57.*

605.4.1.1 Approval. Outdoor fuel oil storage tanks shall be in accordance with UL 80, UL 142 or UL 2085.

605.4.2 Fuel oil storage inside buildings. Fuel oil storage inside buildings shall comply with Sections 605.4.2.2 through 605.4.2.8 or Chapter 57.

605.4.2.1 Approval. Indoor fuel oil storage tanks shall be in accordance with UL 80, UL 142 or UL 2085.

605.4.2.2 Quantity limits. One or more fuel oil storage tanks containing Class II or III combustible liquid shall be permitted in a building. The aggregate capacity of all tanks shall not exceed the following:

1. 660 gallons (2498 L) in unsprinklered buildings, where stored in a tank complying with UL 80, UL 142 or UL 2085.
2. 1,320 gallons (4996 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in a tank complying with UL 142. The tank shall be listed as a secondary containment tank, and the secondary containment shall be monitored visually or automatically.

3. 3,000 gallons (11 356 L) in buildings equipped with an automatic sprinkler system in accordance with Section 903.3.1.1, where stored in protected above-ground tanks complying with UL 2085 and Section 5704.2.9.7. The tank shall be listed as a secondary containment tank, as required by UL 2085, and the secondary containment shall be monitored visually or automatically.

605.4.2.3 Restricted use and connection. Tanks installed in accordance with Section 605.4.2 shall be used only to supply fuel oil to fuel-burning equipment, generators or fire pumps installed in accordance with Section 605.4.2.5. Connections between tanks and equipment supplied by such tanks *for building heating systems* shall be made using closed piping systems in accordance with *NFPA 31. Connections between tanks and equipment supplied by such tanks for generators or fire pumps shall be made using closed piping systems in accordance with NFPA 30.*

605.4.2.4 Applicability of maximum allowable quantity and control area requirements. The quantity of combustible liquid stored in tanks complying with Section 605.4.2 shall not be counted towards the maximum allowable quantity set forth in Table 5003.1.1(1), and such tanks shall not be required to be located in a control area.

605.4.2.5 Installation. Tanks and piping systems *for building heating systems* shall be installed in accordance with *NFPA 31. Tanks and piping systems for generators or fire pumps shall be installed in accordance with NFPA 37.*

605.4.2.6 Separation. Rooms containing fuel oil tanks for internal combustion engines shall be separated from the remainder of the building by fire barriers, horizontal assemblies, or both, with a minimum 1-hour fire-resistance rating with 1-hour fire-protection-rated opening protectives constructed in accordance with the *California Building Code*.

Exception: Rooms containing protected above-ground tanks complying with Section 5704.2.9.7 shall not be required to be separated from surrounding areas.

605.4.2.7 Spill containment. Tanks exceeding 60-gallon (227 L) capacity or an aggregate capacity of 1,000 gallons (3785 L) that are not provided with integral secondary containment shall be provided with spill containment sized to contain a release from the largest tank.

605.4.2.8 Tanks in basements. Tanks in basements shall be located not more than two stories below grade plane.

605.4.3 Underground storage of fuel oil. The storage of fuel oil in underground storage tanks shall comply with UL 58 or UL 1316. *Fuel oil in underground storage tanks for building heating systems shall* be installed in accordance with NFPA 31. *Fuel oil in underground storage tanks for combustion engines and gas turbines shall be installed in accordance with Chapter 57.*

* **605.5 Heating appliances.** Heating appliances shall be listed and shall comply with Sections 605.5.1 and 605.5.2.

[California Code of Regulations, Title 19, Division 1, §3.17(a) and (b)] Guards for Heating Appliances.

Every heating appliance in any occupancy governed by California Code of Regulations, Title 19, Division 1 regulations which does not have protective features incorporated in its design, shall be provided with guards that will provide protection against ignition of clothing and other combustible material.

(a) Appliances employing open flame radiated heat shall have fixed and substantially constructed metallic guards located not less than 10 inches from the radiating flame and the guard members shall be spaced not more than 2 inches apart.

(b) Cabinet type appliances that are not provided with an inner combustion chamber and an air circulating space between the combustion chamber and the outer shell, shall have fixed and substantially constructed metallic guards located not less than 3 inches from the shell and spaced not more than 2 inches apart.

605.5.1 Guard against contact. The heating element or combustion chamber shall be permanently guarded so as to prevent accidental contact by persons or material.

605.5.2 Heating appliance installation and maintenance. Heating appliances shall be installed and maintained in accordance with the manufacturer's instructions, the *California Building Code*, the *International Fuel Gas Code*, the *California Mechanical Code* and *the California Electrical Code.*

605.6 Unauthorized operation. It shall be a violation of this code for any person, user, firm or agent to continue the utilization of any device or appliance (the operation of which has been discontinued or ordered discontinued in accordance with Section 605.2) unless written authority to resume operation is given by the fire code official. Removing or breaking the means by which operation of the device is prevented shall be a violation of this code.

605.7 Incinerators. Commercial, industrial and residential-type incinerators and chimneys shall be constructed in accordance with *California Building Code and the California Mechanical Code. Unless other approved means are provided for the prompt disposal of rubbish, an approved incinerator shall be provided and maintained for the disposal of combustible waste. Incinerators shall be constructed, located and maintained in such manner that waste material can be safely burned at any hour of the day, where local ordinances permit. Fuel-fired and garbage burning incinerators shall be constructed and maintained in conformance with NFPA 82-2019 Incinerators, Waste and Linen Handling Systems and Equipment or UL 791-2006 Standard for Residential Incinerators, whichever is applicable.*

605.7.1 Residential incinerators. Residential incinerators shall be listed and labeled in accordance with UL 791.

605.7.2 Spark arrestor. Incinerators shall be equipped with an effective means for arresting sparks.

605.7.3 Restrictions. Where the fire code official determines that burning in incinerators located within 500 feet (152 m) of mountainous, brush or grass-covered areas will create an undue fire hazard because of atmospheric conditions, such burning shall be prohibited.

605.7.4 Time of burning. Burning shall take place only during approved hours.

605.7.5 Discontinuance. The fire code official is authorized to require incinerator use to be discontinued immediately if the fire code official determines that smoke emissions are offensive to occupants of surrounding property or if the use of incinerators is determined by the fire code official to constitute a hazardous condition.

605.7.6 Flue-fed incinerators in Group I-2. In Group I-2 occupancies, the continued use of existing flue-fed incinerators is prohibited.

605.7.7 Incinerator inspections in Group I-2. Incinerators in Group I-2 occupancies shall be inspected not less than annually in accordance with the manufacturer's instructions. Inspection records shall be maintained on the premises and made available to the fire code official upon request.

605.8 Gas meters. Above-ground gas meters, regulators and piping subject to damage shall be protected by a barrier complying with Section 312 or otherwise protected in an approved manner.

SECTION 606—COMMERCIAL COOKING EQUIPMENT AND SYSTEMS

[M] 606.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of the *California Mechanical Code*.

[M] 606.2 Where required. A Type I hood shall be installed at or above all commercial cooking appliances and domestic cooking appliances used for commercial purposes that produce grease vapors.

Exceptions:

1. Factory-built commercial exhaust hoods that are listed and labeled in accordance with UL 710, and installed in accordance with Section 304.1 of the *California Mechanical Code*, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.1.6 and 507.2.10 of the *California Mechanical Code*.
2. Factory-built commercial cooking recirculating systems that are listed and labeled in accordance with UL 710B, and installed in accordance with Section 304.1 of the *California Mechanical Code*, shall not be required to comply with Sections 507.1.5, 507.2.3, 507.2.5, 507.2.8, 507.3.1, 507.3.3, 507.1.6 and 507.2.10 of the *California Mechanical Code*. Spaces in which such systems are located shall be considered to be kitchens and shall be ventilated in accordance with Table 403.3.1.1 of the *California Mechanical Code*. For the purpose of determining the floor area required to be ventilated, each individual appliance shall be considered as occupying not less than 100 square feet (9.3 m^2).
3. Where cooking appliances are equipped with integral down-draft exhaust systems and such appliances and exhaust systems are listed and labeled for the application in accordance with NFPA 96, a hood shall not be required at or above them.
4. A Type I hood shall not be required for an electric cooking appliance where an approved testing agency provides documentation that the appliance effluent contains 5 mg/m^3 or less of grease when tested at an exhaust flow rate of 500 cfm (0.236 m^3/s) in accordance with UL 710B.

606.3 Operations and maintenance. Commercial cooking systems shall be operated, inspected and maintained in accordance with Sections 606.3.1 through 606.3.4.

606.3.1 Ventilation system. The ventilation system in connection with hoods shall be operated at the required rate of air movement, and grease filters listed and labeled in accordance with UL 1046 shall be in place where equipment under a kitchen grease hood is used.

606.3.2 Grease extractors. Where grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

606.3.3 Cleaning. Hoods, grease-removal devices, fans, ducts and other appurtenances shall be cleaned at intervals as required by Sections 606.3.3.1 through 606.3.3.3.

606.3.3.1 Inspection. Hoods, grease-removal devices, fans, ducts and other appurtenances shall be inspected at intervals specified in Table 606.3.3.1 or as approved by the fire code official. Inspections shall be completed by qualified individuals.

TABLE 606.3.3.1—COMMERCIAL COOKING SYSTEM INSPECTION FREQUENCY

TYPE OF COOKING OPERATIONS	FREQUENCY OF INSPECTION
High-volume cooking operations such as 24-hour cooking, charbroiling or wok cooking	3 months
Low-volume cooking operations such as places of religious worship, seasonal businesses and senior centers	12 months
Cooking operations utilizing solid fuel-burning cooking appliances	1 month
All other cooking operations	6 months

606.3.3.2 Grease accumulation. If during the inspection it is found that hoods, grease-removal devices, fans, ducts or other appurtenances have an accumulation of grease, such components shall be cleaned in accordance with ANSI/IKECA C10.

606.3.3.3 Records. Records for inspections shall state the individual and company performing the inspection, a description of the inspection and when the inspection took place. Records for cleanings shall state the individual and company performing the cleaning and when the cleaning took place. Such records shall be completed after each inspection or cleaning and maintained.

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606.3.3.3.1 Tags. When a commercial kitchen hood or duct system is inspected, a tag containing the service provider name, address, telephone number and date of service shall be provided in a conspicuous location. Prior tags shall be covered or removed.

606.3.4 Extinguishing system service. Automatic fire-extinguishing systems protecting commercial cooking systems shall be serviced as required in Section 904.14.5.

606.4 Appliance connection to building piping. Gas-fired commercial cooking appliances installed on casters and appliances that are moved for cleaning and sanitation purposes shall be connected to the piping system with an appliance connector listed as complying with ANSI Z21.69/CSA 6.16. The commercial cooking appliance connector installation shall be configured in accordance with the manufacturer's installation instructions. Movement of appliances with casters shall be limited by a restraining device installed in accordance with the connector and appliance manufacturer's instructions.

SECTION 607—COMMERCIAL COOKING OIL STORAGE

607.1 General. Storage of cooking oil (grease) in commercial cooking operations utilizing above-ground tanks with a capacity greater than 60 gal (227 L) installed within a building shall comply with Sections 607.2 through 607.7 and NFPA 30. For purposes of this section, cooking oil shall be classified as a Class IIIB liquid unless otherwise determined by testing.

607.2 Metallic storage tanks. Metallic cooking oil storage tanks shall be listed in accordance with UL 80 or UL 142, and shall be installed in accordance with the tank manufacturer's instructions.

607.3 Nonmetallic storage tanks. Nonmetallic cooking oil storage tanks shall be listed in accordance with UL 2152 and shall be installed in accordance with the tank manufacturer's instructions. Tank capacity shall not exceed 200 gallons (757 L) per tank.

607.4 Cooking oil storage system components. Cooking oil storage system components shall include but are not limited to piping, connections, fittings, valves, tubing, hose, pumps, vents and other related components used for the transfer of cooking oil, and are permitted to be of either metallic or nonmetallic construction.

607.4.1 Design standards. The design, fabrication and assembly of system components shall be suitable for the working pressures, temperatures and structural stresses to be encountered by the components.

607.4.2 Components in contact with heated oil. System components that come in contact with heated cooking oil shall be rated for the maximum operating temperatures expected in the system.

607.5 Tank venting. Normal and emergency venting shall be provided for cooking oil storage tanks.

607.5.1 Normal vents. Normal vents shall be located above the maximum normal liquid line, and shall have a minimum effective area not smaller than the largest filling or withdrawal connection. Normal vents shall be permitted to vent inside the building.

607.5.2 Emergency vents. Emergency relief vents shall be located above the maximum normal liquid line, and shall be in the form of a device or devices that will relieve excessive internal pressure caused by an exposure fire. For nonmetallic tanks, the emergency relief vent shall be allowed to be in the form of construction. Emergency vents shall be permitted to vent inside the building.

607.6 Heating of cooking oil. Electrical equipment used for heating cooking oil in cooking oil storage systems shall be listed to UL 499 and shall comply with *the California Electrical Code*. Use of electrical immersion heaters shall be prohibited in nonmetallic tanks.

607.7 Electrical equipment. Electrical equipment used for the operation of cooking oil storage systems shall comply with *the California Electrical Code.*

SECTION 608—MECHANICAL REFRIGERATION

[M] 608.1 Scope. Refrigeration systems shall be installed in accordance with the *California Mechanical Code*.

608.1.1 Refrigerants other than ammonia. Where a refrigerant other than ammonia is used, refrigeration systems and the buildings in which such systems are installed shall be in accordance with ASHRAE 15.

608.1.2 Ammonia refrigeration. Refrigeration systems using ammonia refrigerant and the buildings in which such systems are installed shall comply with IIAR 2 for system design; IIAR 6 for inspection, testing and maintenance; and IIAR 7 for operating procedures. Decommissioning of ammonia refrigeration systems shall comply with IIAR 8, and engineering practices for existing ammonia refrigeration systems shall be in accordance with IIAR 9.

608.2 Permits. An operational permit shall be obtained for refrigeration systems as set forth in Section 105.5.46.

[M] 608.3 Refrigerants. The use and purity of new, recovered and reclaimed refrigerants shall be in accordance with the *California Mechanical Code*.

[M] 608.4 Refrigerant classification. Refrigerants shall be classified in accordance with the *California Mechanical Code*.

[M] 608.5 Change in refrigerant type. A change in the type of refrigerant in a refrigeration system shall be in accordance with the *California Mechanical Code*.

608.6 Access. Access to refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be provided for the fire department at all times as required by the fire code official.

608.7 Testing of equipment. Refrigeration equipment and systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be subject to periodic testing in accordance with Section 608.7.1. Records of tests shall be maintained. Tests of emergency devices or systems required by this chapter shall be conducted by persons trained and qualified in refrigeration systems.

608.7.1 Periodic testing. The following emergency devices or systems shall be periodically tested in accordance with the manufacturer's instructions and as required by the fire code official.

1. Treatment and flaring systems.
2. Valves and appurtenances necessary to the operation of emergency refrigeration control boxes.
3. Fans and associated equipment intended to operate emergency ventilation systems.
4. Detection and alarm systems.

608.8 Emergency signs. Refrigeration units or systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant shall be provided with approved emergency signs, charts and labels in accordance with NFPA 704. Hazard signs shall be in accordance with the *California Mechanical Code* for the classification of refrigerants listed therein.

608.9 Refrigerant detection. Machinery rooms shall be provided with a refrigerant detector with an audible and visible alarm. Where ammonia is used as the refrigerant, detection shall comply with IIAR 2. For refrigerants other than ammonia, refrigerant detection shall comply with Section 608.9.1.

608.9.1 Refrigerants other than ammonia. A detector, or a sampling tube that draws air to a detector, shall be provided at an approved location where refrigerant from a leak is expected to accumulate. The system shall be designed to initiate audible and visible alarms inside of and outside each entrance to the refrigerating machinery room and transmit a signal to an approved location where the concentration of refrigerant detected exceeds the lesser of the following:

1. The corresponding TLV-TWA values shown in the *California Mechanical Code* for the refrigerant classification.
2. Twenty-five percent of the lower flammable limit (LFL).

Detection of a refrigerant concentration exceeding the upper detection limit or 25 percent of the lower flammable limit (LFL), whichever is lower, shall stop refrigerant equipment in the machinery room in accordance with Section 608.10.1.

608.10 Remote controls. Where flammable refrigerants are used and compliance with Section 1106 of the *California Mechanical Code* is required, remote control of the mechanical equipment and appliances located in the machinery room as required by Sections 608.10.1 and 608.10.2 shall be provided at an approved location immediately outside the machinery room and adjacent to its principal entrance.

608.10.1 Refrigeration system emergency shutoff. A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide off-only control of refrigerant compressors, refrigerant pumps and normally closed automatic refrigerant valves located in the machinery room. Additionally, this equipment shall be automatically shut off when the refrigerant vapor concentration in the machinery room exceeds the vapor detector's upper detection limit or 25 percent of the LEL, whichever is lower.

608.10.2 Ventilation system. A clearly identified switch of the break-glass type or with an approved tamper-resistant cover shall provide on-only control of the machinery room ventilation fans.

608.11 Emergency pressure control system. Permanently installed refrigeration systems in machinery rooms containing more than 6.6 pounds (3 kg) of flammable, toxic or highly toxic refrigerant or ammonia shall be provided with an emergency pressure control system in accordance with Sections 608.11.1 and 608.11.2.

608.11.1 Automatic crossover valves. Each high- and intermediate-pressure zone in a refrigeration system shall be provided with a single automatic valve providing a crossover connection to a lower pressure zone. Automatic crossover valves shall comply with Sections 608.11.1.1 through 608.11.1.3.

608.11.1.1 Overpressure limit set point. Automatic crossover valves shall be arranged to automatically relieve excess system pressure to a lower pressure zone if the pressure in a high- or intermediate-pressure zone rises to within 90 percent of the set point for emergency pressure relief devices.

608.11.1.2 Manual operation. Where required by the fire code official, automatic crossover valves shall be capable of manual operation.

608.11.1.3 System design pressure. Refrigeration system zones that are connected to a higher pressure zone by an automatic crossover valve shall be designed to safely contain the maximum pressure that can be achieved by interconnection of the two zones.

608.11.2 Automatic emergency stop. An automatic emergency stop feature shall be provided in accordance with Sections 608.11.2.1 and 608.11.2.2.

608.11.2.1 Operation of an automatic crossover valve. Operation of an automatic crossover valve shall cause all compressors on the affected system to immediately stop. Dedicated pressure-sensing devices located immediately adjacent to crossover valves shall be permitted as a means for determining operation of a valve. To ensure that the automatic crossover valve system provides a redundant means of stopping compressors in an overpressure condition, high-pressure cutout sensors associated with compressors shall not be used as a basis for determining operation of a crossover valve.

608.11.2.2 Overpressure in low-pressure zone. The lowest pressure zone in a refrigeration system shall be provided with a dedicated means of determining a rise in system pressure to within 90 percent of the set point for emergency pressure relief devices. Activation of the overpressure sensing device shall cause all compressors on the affected system to immediately stop.

608.12 Storage, use and handling. Flammable and combustible materials shall not be stored in machinery rooms for refrigeration systems having a refrigerant circuit containing more than 220 pounds (100 kg) of Group A1 or 30 pounds (14 kg) of any other group refrigerant. Storage, use or handling of extra refrigerant or refrigerant oils shall be as required by Chapters 50, 53, 55 and 57.

Exception: This provision shall not apply to spare parts, tools and incidental materials necessary for the safe and proper operation and maintenance of the system.

608.13 Discharge and termination of pressure relief and purge systems. Pressure relief devices, fusible plugs and purge systems discharging to the atmosphere from refrigeration systems containing flammable, toxic or highly toxic refrigerants or ammonia shall comply with Sections 608.13.2 through 608.13.4.

608.13.1 Fusible plugs and rupture members. Discharge piping and devices connected to the discharge side of a fusible plug or rupture member shall have provisions to prevent plugging the pipe in the event the fusible plug or rupture member functions.

608.13.2 Flammable refrigerants. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density equal to or greater than the density of air shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 608.13.5 or a flaring system in accordance with Section 608.13.6. Systems containing more than 6.6 pounds (3 kg) of flammable refrigerants having a density less than the density of air shall be permitted to discharge vapor to the atmosphere provided that the point of discharge is located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit.

608.13.3 Toxic and highly toxic refrigerants. Systems containing more than 6.6 pounds (3 kg) of toxic or highly toxic refrigerants shall discharge vapor to the atmosphere only through an approved treatment system in accordance with Section 608.13.5 or a flaring system in accordance with Section 608.13.6.

608.13.4 Ammonia refrigerant. Systems containing more than 6.6 pounds (3 kg) of ammonia refrigerant shall discharge vapor to the atmosphere in accordance with one of the following methods:

1. Directly to atmosphere where the fire code official determines, on review of an analysis prepared in accordance with Section 104.2.2, that a health hazard would not result from atmospheric discharge of ammonia.
2. Through an approved treatment system in accordance with Section 608.13.5.
3. Through a flaring system in accordance with Section 608.13.6.
4. Through an approved ammonia diffusion system in accordance with Section 608.13.7.
5. By other approved means.

Exception: Ammonia/water absorption systems containing less than 22 pounds (10 kg) of ammonia and for which the ammonia circuit is located entirely outdoors.

608.13.5 Treatment systems. Treatment systems shall be designed to reduce the allowable discharge concentration of the refrigerant gas to not more than 50 percent of the IDLH at the point of exhaust. Treatment systems shall be in accordance with Chapter 60.

608.13.6 Flaring systems. Flaring systems for incineration of flammable refrigerants shall be designed to incinerate the entire discharge. The products of refrigerant incineration shall not pose health or environmental hazards. Incineration shall be automatic upon initiation of discharge, shall be designed to prevent blowback and shall not expose structures or materials to threat of fire. Standby fuel, such as LP-gas, and standby power shall have the capacity to operate for one and one-half the required time for complete incineration of refrigerant in the system. Standby electrical power, where required to complete the incineration process, shall be in accordance with Section 1203.

608.13.7 Ammonia diffusion systems. Ammonia diffusion systems shall include a tank containing 1 gallon of water for each pound of ammonia (8.3 L of water for each 1 kg of ammonia) that will be released in 1 hour from the largest relief device connected to the discharge pipe. The water shall be prevented from freezing. The discharge pipe from the pressure relief device shall distribute ammonia in the bottom of the tank, but not lower than 33 feet (10 058 mm) below the maximum liquid level. The tank shall contain the volume of water and ammonia without overflowing.

608.14 Mechanical ventilation exhaust. Exhaust from mechanical ventilation systems serving refrigeration machinery rooms containing flammable, toxic or highly toxic refrigerants, other than ammonia, capable of exceeding 25 percent of the LFL or 50 percent of the IDLH shall be equipped with approved treatment systems to reduce the discharge concentrations to those values or lower.

Exception: Refrigeration systems containing Group A2L complying with Section 608.18.

608.15 Notification of refrigerant discharges. The fire code official shall be notified immediately when a discharge becomes reportable under state, federal or local regulations in accordance with Section 5003.3.1.

608.16 Records. A record of refrigerant quantities brought into and removed from the premises shall be maintained.

[M] 608.17 Electrical equipment. Where refrigerant of Groups A2, A3, B2 and B3, as defined in the *California Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2, hazardous location classification requirements of *the California Electrical Code.*

Exception: Ammonia machinery rooms that are provided with ventilation in accordance with Section 1101.1.2 of the *California Mechanical Code*.

➡ **[M] 608.18 Group A2L and B2L refrigerant.** Machinery rooms for Group A2L and B2L refrigerant shall comply with Sections 1106.4.1 through 1106.4.3 of the *California Mechanical Code*.

➡ **608.18.1 Elevated temperatures.** Open flame-producing devices or continuously operating hot surfaces over 1,290°F (700°C) shall not be permanently installed in the room.

[M] 608.18.2 Refrigerant detector. In addition to the requirements of Section 1105.3 of the *California Mechanical Code*, refrigerant detectors shall signal an alarm and activate the ventilation system in accordance with the response time specified in Table 608.18.2.

TABLE 608.18.2—GROUP A2L AND B2L DETECTOR ACTIVATION

ACTIVATION LEVEL	MAXIMUM RESPONSE TIME (seconds)	ASHRAE 15 VENTILATION LEVEL	ALARM RESET	ALARM TYPE
Less than or equal to the OEL in Table 1103.1 of the *California Mechanical Code*	300	1	Automatic	Trouble
Less than or equal to the refrigerant concentration level in Table 1103.1 of the *California Mechanical Code*	15	2	Manual	Emergency

[M] 608.18.3 Mechanical ventilation. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.

SECTION 609—HYPERBARIC FACILITIES

609.1 General. Hyperbaric facilities shall be inspected, tested and maintained in accordance with NFPA 99.

609.2 Records. Records shall be maintained of all testing and repair conducted on the hyperbaric chamber and associated devices and equipment. Records shall be available to the fire code official.

SECTION 610—CLOTHES DRYER EXHAUST SYSTEMS

610.1 Clothes dryer exhaust duct systems. Clothes dryer exhaust duct systems shall be in accordance with Sections 610.1.1 and 610.1.2.

610.1.1 Installation. Clothes dryer exhaust duct systems shall be installed in accordance with the *California Mechanical Code* or the *International Fuel Gas Code*, and the manufacturer's installation instructions.

610.1.2 Maintenance. The lint trap, mechanical and heating components, and the exhaust duct system of a clothes dryer shall be maintained in accordance with the manufacturer's operating instructions to prevent the accumulation of lint or debris that prevents the exhaust of air and products of combustion.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 7 – FIRE AND SMOKE PROTECTION FEATURES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
709			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

7

FIRE AND SMOKE PROTECTION FEATURES

User notes:

About this chapter: Chapter 7 provides requirements to maintain the fire-resistance ratings of building elements and to limit fire spread. Section 701 addresses the maintenance of and owner's responsibility for construction elements such as fire barriers and smoke barriers. The rest of the chapter deals with various aspects that also must be maintained to achieve overall fire resistance of the main fire- and smoke-resistive features. These include penetrations, joint protection, door and window openings, and duct and air transfer opening protection.

SECTION 701—GENERAL

701.1 Scope. The provisions of this chapter shall govern the inspection and maintenance of the materials, systems and assemblies used for structural fire resistance, fire-resistance-rated construction separation of adjacent spaces and construction installed to resist the passage of smoke to safeguard against the spread of fire and smoke within a building and the spread of fire to or from buildings. New buildings shall comply with the *California Building Code.*

701.2 Fire-resistance-rated construction. The fire-resistance rating of the following fire-resistance-rated construction shall be maintained:

1. Structural members.
2. Exterior walls.
3. Fire walls, fire barriers, fire partitions.
4. Horizontal assemblies.
5. Shaft enclosures.

701.2.1 Hanging displays. The hanging and displaying of salable goods and other decorative materials from acoustical ceiling systems that are part of a fire-resistance-rated horizontal assembly shall be prohibited.

701.3 Smoke barriers. The fire-resistance rating and smoke-resistant characteristics of smoke barriers shall be maintained.

701.4 Smoke partitions. The smoke-resistant characteristics of smoke partitions shall be maintained.

701.5 Maintaining protection. Materials, systems and devices used to repair or protect breaches and openings in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be maintained in accordance with Sections 703 through 707.

701.6 Owner's responsibility. The owner shall maintain an inventory of all required fire-resistance-rated construction, construction installed to resist the passage of smoke and the construction included in Sections 703 through 707 and Sections 602.4.1 and 602.4.2 of the *California Building Code*. Such construction shall be visually inspected by the *owner* annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Where concealed, such elements shall not be required to be visually inspected by the *owner* unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

701.6.1 Recordkeeping. Records of all required system inspections, testing, repairs and maintenance shall be maintained in accordance with Section 110.3.

701.7 Unsafe conditions. Where any components in this chapter are not maintained and do not function as intended or do not have the fire resistance or the resistance to the passage of smoke required by the code under which the building was constructed, remodeled or altered, such component(s) or portion thereof shall be deemed an unsafe condition, in accordance with Section 115.1.1. Components or portions thereof determined to be unsafe shall be repaired or replaced to conform to that code under which the building was constructed, remodeled or altered or this chapter, as deemed appropriate by the fire code official.

Where the condition of components is such that any building, structure or portion thereof presents an imminent danger to the occupants of the building, structure or portion thereof, the fire code official shall act in accordance with Section 115.2.

SECTION 702—DEFINITIONS

702.1 Definitions. The following terms are defined in Chapter 2:

DRAFTSTOP.

FIREBLOCKING.

MEMBRANE-PENETRATION FIRESTOP SYSTEM.

OPENING PROTECTIVE.

SMOKE BARRIER.

SMOKE PARTITION.

THROUGH-PENETRATION FIRESTOP SYSTEM.

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SECTION 703—PENETRATIONS

703.1 Maintaining protection. Materials and firestop systems used to protect membrane and through penetrations in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be maintained. The materials and firestop systems shall be securely attached to or bonded to the construction being penetrated with no openings visible through or into the cavity of the construction. Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer's installation instructions.

703.2 Repair of penetrations. Where damaged, materials used to protect membrane- and through-penetrations shall be replaced or restored with materials or systems that meet or exceed the code requirements applicable at the time when the assembly was constructed, remodeled or altered.

SECTION 704—JOINTS AND VOIDS

704.1 Maintaining protection. Where required when the building was originally constructed, materials and systems used to protect joints and voids in the following locations shall be maintained. The materials and systems shall be securely attached to or bonded to the adjacent construction, without openings visible through the construction.

1. Joints in or between fire-resistance-rated walls, floors or floor/ceiling assemblies and roof or roof/ceiling assemblies.
2. Joints in smoke barriers.
3. Voids at the intersection of a horizontal floor assembly and an exterior curtain wall.
4. Voids at the intersection of a horizontal smoke barrier and an exterior curtain wall.
5. Voids at the intersection of a nonfire-resistance-rated floor assembly and an exterior curtain wall.
6. Voids at the intersection of a vertical fire barrier and an exterior curtain wall.
7. Voids at the intersection of a vertical fire barrier and a nonfire-resistance-rated roof assembly.

Unprotected joints and voids do not need to be protected where such joints and voids were not required to be protected when the building was originally constructed. Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer's installation instructions.

704.2 Repair of joints and voids. Where damaged, materials used to protect joints and voids shall be replaced or restored with materials or systems that meet or exceed the code requirements applicable at the time when the assembly was constructed, remodeled or altered.

704.3 Opening protectives. Where openings are required to be protected, opening protectives shall be maintained self-closing or automatic-closing by smoke detection. Existing fusible-link-type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

SECTION 705—DOOR AND WINDOW OPENINGS

705.1 General. Where required when the building was originally constructed, opening protectives installed in fire-resistance-rated assemblies, smoke barriers and smoke partitions shall be inspected and maintained in accordance with this section.

705.2 Inspection and maintenance. Opening protectives in fire-resistance-rated assemblies shall be inspected and maintained in accordance with NFPA 80. Opening protectives in smoke barriers shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. Openings in smoke partitions shall be inspected and maintained in accordance with NFPA 105. Fire doors and smoke and draft control doors shall not be blocked, obstructed, or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Opening protectives and smoke and draft control doors shall not be modified.

705.2.1 Labeling requirements. Where approved by the fire code official, the application of field-applied labels associated with the maintenance of opening protectives shall follow the requirements of the approved third-party certification organization accredited for listing the opening protective.

705.2.2 Signs. Where required by the fire code official, a sign shall be permanently displayed on or near each fire door in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: "FIRE DOOR—DO NOT BLOCK."
2. For doors designed to be kept normally closed: "FIRE DOOR—KEEP CLOSED."

705.2.3 Hold-open devices and closers. Hold-open devices and automatic door closers, where provided, shall be maintained. During the period that such device is out of service for repairs, the door it operates shall remain in the closed position.

705.2.4 Door operation. Swinging fire doors shall close from the full-open position and latch automatically.

705.2.5 Smoke- and heat-activated doors. Smoke-activated doors shall be maintained to self-close or automatically close upon detection of smoke. Existing fusible-link-type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

705.2.6 Testing. Horizontal and vertical sliding and rolling fire doors shall be inspected and tested annually to confirm proper operation and full closure. Records of inspections and testing shall be maintained.

705.2.7 Periodic inspection and testing of rolling steel fire doors. Rolling steel fire doors shall be inspected and tested annually by a trained rolling steel fire door systems technician in accordance with the applicable provisions of NFPA 80. Records of inspections and testing shall be maintained.

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SECTION 706—DUCT AND AIR TRANSFER OPENINGS

706.1 Maintaining protection. Dampers protecting ducts and air transfer openings shall be inspected and maintained in accordance with NFPA 80 and NFPA 105. Other products or materials used to protect the openings for ducts and air transfer openings shall be securely attached to or bonded to the construction containing the duct or air transfer opening, without visible openings through or into the cavity of the construction. Any damaged products or materials protecting duct and air transfer openings shall be repaired, restored or replaced.

706.2 Unprotected openings. Unprotected duct and air transfer openings in fire-resistance-rated construction and construction installed to resist the passage of smoke shall be protected so as to comply with requirements that were in effect when the building was constructed.

SECTION 707—CONCEALED SPACES

707.1 Fireblocking and draftstopping. Required fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

SECTION 708—SPRAY FIRE-RESISTANT MATERIALS AND INTUMESCENT FIRE-RESISTANT MATERIALS

708.1 Maintaining protection. Where required when the building was originally permitted and constructed, spray fire-resistant materials and intumescent fire-resistant materials shall be visually inspected to verify that the materials do not exhibit exposure to the substrate.

SECTION 709—EXTERIOR WALLS

709.1 Exterior graphics on exterior walls of high-rise buildings. *Where installed on the exterior walls of high-rise buildings, exterior graphics, both permanent and temporary, greater than 100 square feet in area or greater than 10 feet in either dimension shall comply with the following conditions subject to the review and approval of the fire code official and building official:*

1. *The materials used for graphics installed at a height greater than 40 feet above the grade plane shall be noncombustible materials or shall have a flame spread index not greater than 25 when tested in accordance with ASTM E84 or UL 723.*
2. *The method of attachment and mounting of the graphics to the exterior wall shall be such that the graphics are securely attached.*
3. *The graphics shall not interfere with the active or passive ventilation required for the building and the required smoke control systems in the building.*
4. *The graphics shall not impair the functions of any fire or life safety systems in the building.*

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 8 – INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
[T-19 §1172]				X																			
[T-19 §1173]				X																			
[T-19 §1174]				X																			
[T-19 §1191]				X																			
[T-19 §1196]				X																			
[T-19 §1201]				X																			
[T-19 §1202]				X																			
Table 803.3			X																				
[T-19 §3.21(a)(b)]				X																			
803.5.1.2			X																				
803.5.1.3			X																				
804.1			X																				
804.3.3.1			X																				
804.3.3.2			X																				
804.3.3.3			X																				
805.1 *Reserved*			X																				
805.2.1.2			X																				
805.4.1.2			X																				
806.1.4			X																				
[T-19 §3.08]				X																			
[T-19 §3.08]				X																			
[T-19 §1273.1]				X																			
[T-19 §1273.2]				X																			
807.3			X																				
[T-19 §1321.1]				X																			
[T-19 §1324]				X																			
[T-19 §1325]				X																			
[T-19 §1326]				X																			
[T-19 §1327]				X																			
807.4			X																				
807.5.1.2.1			X																				
807.5.1.2.2			X																				
807.5.3 – 807.5.3.4			X																				
807.5.7			X																				
807.5.7.1			X																				
808.1			X																				
[T-19 §3.19 (b)(c)]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

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CHAPTER

8

INTERIOR FINISH, DECORATIVE MATERIALS AND FURNISHINGS

User notes:

About this chapter: Chapter 8 provides requirements for interior finishes, decorative materials and furnishings in new and existing buildings so that they do not significantly add to or create fire hazards in buildings. The provisions tend to focus on occupancies with specific risk characteristics, such as vulnerability of occupants, density of occupants, lack of familiarity with the building and societal expectations of importance. This chapter is consistent with Chapter 8 of the *California Building Code*, which regulates the interior finishes and decorative materials of new buildings.

SECTION 801—GENERAL

801.1 Scope. The provisions of this chapter shall govern interior finish, interior trim, furniture, furnishings, decorative materials and decorative vegetation in buildings. Existing buildings shall comply with Sections 803 through 808. New buildings shall comply with Sections 804 through 808, and Section 803 of the *California Building Code.*

[California Code of Regulations, Title 19, Division 1, §1172] Purpose.

California Code of Regulations, Title 19, Division 1, Chapter 8 have been prepared and adopted for the purpose of establishing minimum standards for the prevention of fire and for the protection of life and property against fire and panic through the use of flame-retardant chemicals, fabrics and materials.

[California Code of Regulations, Title 19, Division 1, §1173] Scope.

California Code of Regulations, Title 19, Division 1, Chapter 8 shall govern the manufacture, sale and application of flame-retardant chemicals used in connection with fabrics or materials required to be treated and maintained in a flame-retardant condition as provided in Sections 13115 or 13119 of the Health and Safety Code. These rules and regulations shall also apply to fabrics or materials inherently nonflammable and, they shall also establish minimum fire-resistive standards for such fabrics or materials.

California Code of Regulations, Title 19, Division 1, Chapter 8 shall also establish minimum standards and specific procedures for the approval of flame-retardant chemicals, flame retardant materials and flame retardant applicator concerns.

[California Code of Regulations, Title 19, Division 1, §1174] Basis.

California Code of Regulations, Title 19, Division 1, Chapter 8 are based upon the presumption of fact that fabrics and similar materials commonly known to be flammable increase, or may cause the increase of, the hazard or menace of fire; that proper and adequate flame-retardant treatment through the use of certain chemicals is possible whereby the danger to life and property from fire and panic can be materially reduced; and, that there do exist certain fabrics and materials which by nature are nonflammable.

SECTION 802—DEFINITIONS

802.1 Definitions. The following terms are defined in Chapter 2:

FLAME SPREAD.

FLAME SPREAD INDEX.

INTERIOR FLOOR-WALL BASE.

SITE-FABRICATED STRETCH SYSTEM.

SMOKE-DEVELOPED INDEX.

[California Code of Regulations, Title 19, Division 1, §1191] Approved.

"Approved" means approved by the State Fire Marshal.

[California Code of Regulations, Title 19, Division 1, §1196] Flame-retardant Chemical.

"Flame-Retardant Chemical," as used herein, means any chemical, chemical compound or chemical mixture which when properly applied to a fabric or material will render such fabric or material incapable of supporting combustion to the extent that it will successfully withstand the tests and meet the specifications promulgated by the State Fire Marshal.

[California Code of Regulations, Title 19, Division 1, §1201] Nonflammable Material.

"Nonflammable Material," as used herein, means a fabric or material which is inherently flame-resistant to the extent that it will meet the requirements of the fire resistance test herein prescribed, but shall not include materials which must be chemically treated or processed after manufacture to make them flame-resistant.

[California Code of Regulations, Title 19, Division 1, §1202] Place of Public Assemblage.

"Place of Public Assemblage," as used herein, means any occupancy mentioned in Sections 13115 or 13119 of the Health and Safety Code.

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SECTION 803—INTERIOR WALL AND CEILING FINISH IN EXISTING BUILDINGS

803.1 General. The provisions of this section shall limit the allowable fire performance and smoke development of interior wall and ceiling finishes in existing buildings based on location and occupancy classification. Interior wall and ceiling finishes shall be classified in accordance with Section 803 of the *California Building Code*. Such materials shall be classified in accordance with NFPA 286, as indicated in Section 803.1.1, or in accordance with ASTM E84 or UL 723, as indicated in Section 803.1.2.

Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.

803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and tested in accordance with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to comply with the requirements of Class A specified in Section 803.1.2.

803.1.1.1 Acceptance criteria for NFPA 286. The interior finish shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m^2.

803.1.2 Interior wall and ceiling finish materials tested in accordance with ASTM E84 or UL 723. Interior wall and ceiling finishes shall be classified in accordance with ASTM E84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indices:

Class A: Flame spread index 0–25; smoke-developed index 0–450.

Class B: Flame spread index 26–75; smoke-developed index 0–450.

Class C: Flame spread index 76–200; smoke-developed index 0–450.

Exception: Materials tested in accordance with Section 803.1.1 and as indicated in Sections 803.1.3 through 803.15.

803.1.3 Interior wall and ceiling finish materials with specific requirements. The materials indicated in Sections 803.4 through 803.15 shall be tested as indicated in the corresponding sections.

803.2 Stability. Interior finish materials regulated by this chapter shall be applied or otherwise fastened in such a manner that such materials will not readily become detached where subjected to room temperatures of 200°F (93°C) for not less than 30 minutes.

803.3 Interior finish requirements based on occupancy. Interior wall and ceiling finish shall have a flame spread index not greater than that specified in Table 803.3 for the group and location designated. Interior wall and ceiling finish materials tested in accordance with NFPA 286, and meeting the acceptance criteria of Section 803.1.1.1, shall be used where a Class A classification in accordance with ASTM E84 or UL 723 is required.

TABLE 803.3—INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]

GROUP	SPRINKLERED[l]			NONSPRINKLERED		
	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]	Interior exit stairways and ramps and exit passageways[a, b]	Corridors and enclosure for exit access stairways and ramps	Rooms and enclosed spaces[c]
A-1 and A-2	B	B	C	A	A[d]	B[e]
A-3[f], A-4, A-5	B	B	C	A	A[d]	C
B, E, M, R-1, R-4	B	C[m]	C	A	B[m]	C
F	C	C	C	B	C	C
H, *L*	B	B	C[g]	A	A	B
I-1	B	C	C	A	B	B
I-3	A	A[j]	C	A	A	B
I-4	B	B	B[h, i]	A	A	B
R-2	C	C	C	B	B	C
R-2.1	*B*	*C*	*C*	*A*	*B*	*B*
R-3, *R-3.1*	C	C	C	C	C	C
S	C	C	C	B	B	C
U	No Restrictions			No Restrictions		

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TABLE 803.3—INTERIOR WALL AND CEILING FINISH REQUIREMENTS BY OCCUPANCY[k]—continued

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2.

NP=Not Permitted [SFM]

a. Class C interior finish materials shall be allowed for wainscoting or paneling of not more than 1,000 square feet of applied surface area in the grade lobby where applied directly to a noncombustible base or over furring strips applied to a noncombustible base and fireblocked as required by Section 803.11 of the *California Building Code*.

b. *In other than Group I-2 occupancies in buildings less than three stories above grade plane of other than Group I-3, Class B interior finish for nonsprinklered buildings and Class C interior finish for sprinklered buildings shall be permitted in interior exit stairways and ramps.*

c. Requirements for rooms and enclosed spaces shall be based on spaces enclosed by partitions. Where a fire-resistance rating is required for structural elements, the enclosing partitions shall extend from the floor to the ceiling. Partitions that do not comply with this shall be considered as enclosing spaces and the rooms or spaces on both sides shall be considered as one. In determining the applicable requirements for rooms and enclosed spaces, the specific occupancy thereof shall be the governing factor, regardless of the group classification of the building or structure.

d. Lobby areas in Group A-1, A-2 and A-3 occupancies shall be not less than Class B materials.

e. Class C interior finish materials shall be allowed in Group A occupancies with an occupant load of 300 persons or less.

f. In places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall be allowed.

g. Class B material is required where the building exceeds two stories.

h. Class C interior finish materials shall be allowed in administrative spaces.

i. Class C interior finish materials shall be allowed in rooms with a capacity of four persons or less.

j. Class B materials shall be allowed as wainscoting extending not more than 48 inches above the finished floor in corridors.

k. Finish materials as provided for in other sections of this code.

l. Applies where the vertical exits, exit passageways, corridors or rooms and spaces are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

m. Corridors in ambulatory care facilities shall have a Class B or better interior finish material.

803.4 Fire-retardant coatings. The required flame spread or smoke-developed index of surfaces in existing buildings shall be allowed to be achieved by application of approved fire-retardant coatings, paints or solutions to surfaces having a flame spread index exceeding that allowed. Such applications shall comply with NFPA 703 and the required fire-retardant properties shall be maintained or renewed in accordance with the manufacturer's instructions. The fire-retardant paint, coating or solution shall have been assessed by testing over the same substrate to be used in the application.

803.5 Textile wall coverings. Where used as interior wall finish materials, textile wall coverings, including materials having a woven, nonwoven, napped, tufted, looped or similar surface, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1, 803.5.1 or 803.5.2.

[California Code of Regulations, Title 19, Division 1, §3.21(a) and (b)] Interior Finish of Decorative Material.

(a) Unframed Rigid Combustible Decorative Material. Rigid combustible decorative material and assemblies of materials not more than $^1/_4$ inch in thickness used for folding doors, room dividers, decorative screens and similar applications, which do not create concealed spaces and which are installed with exposed edges, shall be flame resistant in accordance with the following:

(1) Test specimen shall be 12 inches wide and 24 inches long. Four specimens shall be tested, two in each direction of the material.

(2) The specimen shall be suspended vertically with its lower edge 2 inches above the top of a $^3/_8$ inch diameter Bunsen Burner. The test shall be performed in a draft-free area.

(3) The flames from the burner shall be 4 inches long and shall be adjusted with sufficient air supply to eliminate any yellow flame tips but without any distinct inner blue cone.

(4) The specimen shall be exposed to the flame at each corner and at not less than one other point along the lower edge. Each exposure shall be of sufficient duration to determine if the material will ignite and continue to burn, but shall be not less than 20 seconds.

(5) The criteria for acceptance shall be as follows:

(A) There shall be not more than intermittent flaming appreciably beyond the area exposed to the test flame.

(B) No flame shall reach the top of the specimen.

(C) On removing the test flame there shall be not more than one second of after flaming except there may be nonprogressive flaming of short duration in areas of accumulated char which were directly exposed to the test flame.

(b) Framed Rigid Combustible Decorative Material. Rigid combustible decorative material and assemblies of materials not more than $^1/_4$ inch in thickness used for folding doors, room dividers, decorative screens and similar applications, and which are installed with all edges protected, shall conform to the following:

(1) All exposed edges shall be protected with frames of metal or other noncombustible material, or solid wood of minimum $^1/_4$ inch dimension.

(2) The total square foot area of the material shall not exceed ten percent of that of the floor area of the room in which the material is installed.

(3) When tested as follows, no flames shall reach the top edge of the specimen.

The test shall be conducted in a draft free area, on a specimen of the material 12 inches by 12 inches suspended at a 45 degree angle from the horizontal with the upper and lower edges in a horizontal plane. The test flame shall be 3 inches long from a Bunsen Burner of approximately $^1/_2$ inch inside diameter with the air supply completely shut off. The burner shall be so positioned so that its top is 1 inch vertically below a point on the lower surface of the test specimen, 1 inch up from its lower horizontal edge, and mid-way between the inclined edges. The exposure to the test flame and the duration of test shall be for a period of 2 minutes.

803.5.1 Room corner test for textile wall coverings and expanded vinyl wall coverings. Textile wall coverings and expanded vinyl wall coverings shall meet the criteria of Section 803.5.1.1 when tested in the manner intended for use in accordance with the Method B protocol of NFPA 265 using the product mounting system, including adhesive. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.5.1.1 Acceptance criteria for NFPA 265 Method B test protocol. Where testing to NFPA 265, the interior finish shall comply with the following:

1. During the 40-kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremities of the samples on the 8-foot by 12-foot (203 by 305 mm) walls.
3. Flashover, as defined in NFPA 265, shall not occur.
4. For newly introduced wall coverings, the total smoke released throughout the test shall not exceed 1,000 m^2.

803.5.1.2 Unframed rigid combustible decorative material. *Rigid combustible decorative material and assemblies of materials not more than $^1/_4$ inch in thickness used for folding doors, room dividers, decorative screens and similar applications, which do not create concealed spaces and which are installed with exposed edges, shall be flame resistant in accordance with SFM Standard 12-7-5 contained in Title 24, Part 12, California Referenced Standards Code.*

803.5.1.3 Framed rigid combustible decorative material. *Rigid combustible decorative material and assemblies of materials not more than $^1/_4$ inch in thickness used for folding doors, room dividers, decorative screens and similar applications, and which are installed with all edges protected, shall conform to SFM Standard 12-7-5 contained in Title 24, Part 12, California Referenced Standards Code.*

803.5.2 Acceptance criteria for wall and ceiling coverings. Textile wall and ceiling coverings shall have a Class A flame spread index in accordance with ASTM E84 or UL 723, and be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.6 Textile ceiling coverings. Where used as interior ceiling finish materials, textile ceiling coverings, including materials having a woven, nonwoven, napped, tufted, looped or similar surface and carpet or similar textile materials, shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

803.7 Expanded vinyl wall coverings. Where used as interior wall finish materials, expanded vinyl wall coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1, 803.5.1 or 803.5.2.

803.8 Expanded vinyl ceiling coverings. Where used as interior ceiling finish materials, expanded vinyl ceiling coverings shall be tested in the manner intended for use, using the product mounting system, including adhesive, and shall comply with the requirements of Section 803.1.1 or 803.5.2.

[BF] 803.9 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish, it shall comply with Section 803.1.1.

[BF] 803.10 Site-fabricated stretch systems. Where used as newly installed interior wall or interior ceiling finish materials, site-fabricated stretch systems containing all three components described in the definition in Chapter 2 shall be tested in the manner intended for use, and shall comply with the requirements of Section 803.1.1 or 803.1.2. If the materials are tested in accordance with ASTM E84 or UL 723, specimen preparation and mounting shall be in accordance with ASTM E2573.

803.11 Foam plastic materials. Foam plastic materials shall not be used as interior wall and ceiling finish unless specifically allowed by Section 803.11.1 or 803.11.2. Foam plastic materials shall not be used as interior trim unless specifically allowed by Section 804.2.

803.11.1 Foam plastics. Foam plastics shall be allowed to be used as interior wall and ceiling finish only where in accordance with Section 2603.9 of the *California Building Code*. This section shall apply both to exposed foam plastics and to foam plastics used in conjunction with a textile or vinyl facing or cover.

803.11.2 Thermal barrier for foam plastics. Foam plastic material shall be allowed if it is separated from the interior of the building by a thermal barrier in accordance with Section 2603.4 of the *California Building Code.*

803.12 Facings or wood veneers intended to be applied on site over a wood substrate. Facings or veneers intended to be applied on site over a wood substrate shall comply with one of the following:

1. The facing or veneer shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, described in Section 5.8.9 of NFPA 286.
2. The facing or veneer shall have a Class A, B or C flame spread index and smoke-developed index based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2404.

803.13 Laminated products factory produced with an attached wood substrate. Laminated products factory produced with an attached wood substrate shall comply with one of the following:

1. The laminated product shall meet the criteria of Section 803.1.1 when tested in accordance with NFPA 286 using the product mounting system, including adhesive, of actual use.
2. The laminated product shall have a Class A, B or C flame spread index and smoke-developed index based on the requirements of Table 803.3, in accordance with ASTM E84 or UL 723. Test specimen preparation and mounting shall be in accordance with ASTM E2579.

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803.14 Thickness exemption. Materials having a thickness less than 0.036 inch (0.9 mm) applied directly to the surface of walls or ceilings shall not be required to be tested.

803.15 Heavy timber exemption. Exposed portions of building elements complying with the requirements of Type IV construction in accordance with the *California Building Code* shall not be subject to interior finish requirements.

SECTION 804—INTERIOR WALL AND CEILING TRIM AND INTERIOR FLOOR FINISH IN NEW AND EXISTING BUILDINGS

804.1 Interior trim. Combustible trim in new and existing buildings, excluding handrails and guards, shall not exceed 10 percent of the specific wall or ceiling areas to which it is attached. Other than foam plastic, material used as interior trim shall *have minimum Class B flame spread and 450 smoke-developed index in Group I-3 and for all other occupancies shall* comply with Section 804.1.1 or 804.1.2. Foam plastic used as interior trim shall comply with Section 804.2.

804.1.1 Testing in accordance with NFPA 286. Interior trim material shall be tested in accordance with NFPA 286 and comply with the acceptance criteria in Section 803.1.1.1. Where the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it shall not be required to be tested for flame spread index and smoke-developed index in accordance with ASTM E84 or UL 723.

804.1.2 Testing in accordance with ASTM E84 or UL 723. Material, other than foam plastic, used as interior trim shall have minimum Class C flame spread and smoke-developed indices, when tested in accordance with ASTM E84 or UL 723, as described in Section 803.1.2.

804.2 Foam plastic interior trim. Foam plastic used as interior trim shall comply with Sections 804.2.1 through 804.2.4.

804.2.1 Density. The minimum density of the interior trim shall be 20 pounds per cubic foot (320 kg/m^3).

804.2.2 Thickness. The maximum thickness of the interior trim shall be $^1/_2$ inch (12.7 mm) and the maximum width shall be 8 inches (203 mm).

804.2.3 Area limitation. The interior trim shall not constitute more than 10 percent of the specific wall or ceiling area to which it is attached.

804.2.4 Flame spread. The flame spread index shall not exceed 75 where tested in accordance with ASTM E84 or UL 723. The smoke-developed index shall not be limited.

Exception: Where the interior trim material has been tested as an interior finish in accordance with NFPA 286 and complies with the acceptance criteria in Section 803.1.1.1, it is not required to be tested for flame spread index in accordance with ASTM E84 or UL 723.

804.3 New interior floor finish. New interior floor finish and floor covering materials in new and existing buildings shall comply with Sections 804.3.1 through 804.3.3.2.

Exception: Floor finishes and coverings of a traditional type, such as wood, vinyl, linoleum or terrazzo, and resilient floor covering materials that are not composed of fibers.

804.3.1 Classification. Interior floor finish and floor covering materials required by Section 804.3.3.2 to be of Class I or II materials shall be classified in accordance with ASTM E648 or NFPA 253. The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watts/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

804.3.2 Testing and identification. Interior floor finish and floor covering materials shall be tested by an approved agency in accordance with ASTM E648 or NFPA 253 and identified by a hang tag or other suitable method so as to identify the manufacturer or supplier and style, and shall indicate the interior floor finish or floor covering classification in accordance with Section 804.3.1. Carpet-type floor coverings shall be tested as proposed for use, including underlayment. Test reports confirming the information provided in the manufacturer's product identification shall be furnished to the fire code official upon request.

804.3.3 Interior floor finish requirements. New interior floor covering materials shall comply with Sections 804.3.3.1 and 804.3.3.2, and interior floor finish materials shall comply with Section 804.3.1.

804.3.3.1 ***Test requirement.*** *In all occupancies, interior floor finish and interior floor covering materials shall comply with the requirements of ASTM Standard E648, and having a specific optical density smoke rating not to exceed 450 per ASTM E662. For Group I-3 occupancies and Group I-2 areas where patients are restrained, see Section 804.3.3.3.*

804.3.3.2 Minimum critical radiant flux. In all occupancies, new interior floor finish and floor covering materials in enclosures for stairways and ramps, exit passageways, corridors and rooms or spaces not separated from corridors by full-height partitions extending from the floor to the underside of the ceiling shall withstand a minimum critical radiant flux. The minimum critical radiant flux shall be not less than Class I in Groups I-2 and I-3 *areas where restraint is not used and R-2.1* and not less than Class II in Groups A, B, E, H, I-4, M, R-1, R-2, *R-2.2* and S.

Exception: Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, Class II materials shall be permitted in any area where Class I materials are required and materials complying with *ASTM Standard E648, and having a specific optical density smoke rating not to exceed 450 per ASTM E662 are permitted in any area where Class II materials are required.*

For Group I-3 areas occupied by inmates or Group I-2 areas where patients are restrained, see Section 804.3.3.3.

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804.3.3.3 Group I-2 and Group I-3 floor surfaces. *Interior floor finish and floor coverings occupied by inmates or patients whose personal liberties are restrained shall be noncombustible. Carpet or other floor covering materials may be used in areas protected by an automatic sprinkler system installed throughout in accordance with Section 903.3.1.1. Carpet or other floor coverings shall comply with the requirements of ASTM Standard E648; the minimum critical radiant flux shall be not less than Class I and the specific optical density smoke rating shall not exceed 450 per ASTM E662. Carpeting and carpet padding shall be tested as a unit in accordance with floor covering radiant panel test meeting Class 1 and has a critical radiant flux limit of not less than 0.45 watt per centimeter square. The carpeting and padding shall be identified by a hang-tag or other suitable method as to manufacturer and style and shall indicate the classification of the material based on the limits set forth above.*

804.4 Interior floor-wall base. Interior floor-wall base that is 6 inches (152 mm) or less in height shall be tested in accordance with ASTM E648 or NFPA 253 and shall be not less than Class II. Where a Class I floor finish is required, the floor-wall base shall be Class I. The classification referred to herein corresponds to the classifications determined by ASTM E648 or NFPA 253 as follows: Class I, 0.45 watt/cm^2 or greater; Class II, 0.22 watts/cm^2 or greater.

Exception: Interior trim materials that comply with Section 804.1.

SECTION 805—UPHOLSTERED FURNITURE AND MATTRESSES IN NEW AND EXISTING BUILDINGS

805.1 ***Reserved.***

805.2 Group I-2 and Group B ambulatory care facilities. The requirements in Sections 805.2.1 through 805.2.2 shall apply to Group I-2 occupancies and Group B ambulatory care facilities.

805.2.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.2.1.1 through 805.2.1.3.

805.2.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following: (a) mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261 or (b) the components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

➡ **Exception:** Upholstered furniture belonging to the patients in sleeping rooms of Group I-2 occupancies, provided that a smoke detector is installed in such rooms. Battery-powered, single-station smoke alarms shall be allowed.

805.2.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E1537 or California Technical Bulletins *116 and 117*, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.2.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.2.1.1 and 805.2.1.2.

805.2.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.2.2.1 through 805.2.2.3.

805.2.2.1 Ignition by cigarettes. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

805.2.2.2 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.

   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.2.2.3 Identification. Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.2.2.1 and 805.2.2.2.

805.3 Group I-3, detention and correction facilities. The requirements in Sections 805.3.1 through 805.3.2 shall apply to detention and correction facilities classified in Group I-3.

805.3.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.3.1.1 through 805.3.1.3.

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805.3.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding 1.5 inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.3.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E1537, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.
2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

805.3.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.3.1.1 and 805.3.1.2.

805.3.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.3.2.1 through 805.3.2.3.

805.3.2.1 Ignition by cigarettes. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

805.3.2.2 Fire performance tests. Newly introduced mattresses shall be tested in accordance with Section 805.3.2.2.1 or 805.3.2.2.2.

805.3.2.2.1 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.
2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

805.3.2.2.2 Mass loss test. Newly introduced mattresses shall have a mass loss not exceeding 15 percent of the initial mass of the mattress where tested in accordance with the test in Annex A3 of ASTM F1085.

805.3.2.3 Identification. Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.3.2.1 and 805.3.2.2.

805.4 Group R-2 college and university dormitories. The requirements of Sections 805.4.1 through 805.4.2.3 shall apply to college and university dormitories classified in Group R-2, including decks, porches and balconies.

805.4.1 Upholstered furniture. Newly introduced upholstered furniture shall meet the requirements of Sections 805.4.1.1 through 805.4.1.3.

805.4.1.1 Ignition by cigarettes. Newly introduced upholstered furniture shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with one of the following:

1. Mocked-up composites of the upholstered furniture shall have a char length not exceeding $1^1/_2$ inches (38 mm) when tested in accordance with NFPA 261.
2. The components of the upholstered furniture shall meet the requirements for Class I when tested in accordance with NFPA 260.

805.4.1.2 Heat release rate. Newly introduced upholstered furniture shall have limited rates of heat release when tested in accordance with ASTM E1537 or California Technical Bulletins *116 and 117*, as follows:

1. The peak rate of heat release for the single upholstered furniture item shall not exceed 80 kW.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

2. The total heat released by the single upholstered furniture item during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Upholstered furniture in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.4.1.3 Identification. Upholstered furniture shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.4.1.1 and 805.4.1.2.

805.4.2 Mattresses. Newly introduced mattresses shall meet the requirements of Sections 805.4.2.1 through 805.4.2.3.

805.4.2.1 Ignition by cigarettes. Newly introduced mattresses shall be shown to resist ignition by cigarettes as determined by tests conducted in accordance with DOC 16 CFR Part 1632 and shall have a char length not exceeding 2 inches (51 mm).

805.4.2.2 Heat release rate. Newly introduced mattresses shall have limited rates of heat release when tested in accordance with ASTM E1590 or California Technical Bulletin 129, as follows:

1. The peak rate of heat release for the single mattress shall not exceed 100 kW.

   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

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2. The total heat released by the single mattress during the first 10 minutes of the test shall not exceed 25 MJ.

   Exception: Mattresses in rooms or spaces protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.

805.4.2.3 Identification. Mattresses shall bear the label of an approved agency, confirming compliance with the requirements of Sections 805.4.2.1 and 805.4.2.2.

SECTION 806—NATURAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

806.1 Natural cut trees. Natural cut trees, where allowed by this section, shall have the trunk bottoms cut off not less than 0.5 inch (12.7 mm) above the original cut and shall be placed in a support device complying with Section 806.1.2.

➡ **806.1.1 Restricted occupancies.** Natural cut trees shall be prohibited within ambulatory care facilities and Group A, E, I-2, I-3, I-4, M, R-1, R-2 and R-4 occupancies.

Exceptions:

1. Trees located in areas protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 shall not be prohibited in Groups A, E, M, R-1 and R-2.
2. Trees shall be allowed within dwelling units in Group R-2 occupancies.

806.1.2 Support devices. The support device that holds the tree in an upright position shall be of a type that is stable and that meets all of the following criteria:

1. The device shall hold the tree securely and be of adequate size to avoid tipping over of the tree.
2. The device shall be capable of containing a minimum two-day supply of water.
3. The water level, when full, shall cover the tree stem not less than 2 inches (51 mm). The water level shall be maintained above the fresh cut and checked not less than once daily.

806.1.3 Dryness. The tree shall be removed from the building whenever the needles or leaves fall off readily when a tree branch is shaken or if the needles are brittle and break when bent between the thumb and index finger. The tree shall be checked daily for dryness.

806.1.4 Fire-retardant treatments for natural cut trees. Where fire-retardant treatments are applied to natural cut trees, the fire-retardant treatment shall be tested by an approved agency and *shall be treated and maintained in a flame-retardant condition by means of a flame-retardant solution or process approved by the State Fire Marshal, as set forth in California Code of Regulations, Title 19, Division 1, Chapter 8.*

[California Code of Regulations, Title 19, Division 1, §3.08]. Decorative Materials.

In every Group A, E, I, R-1, R-2, R-2.1, R-3.1 and R-4 occupancy, all drapes, hangings, curtains, drops and all other decorative material, including Christmas trees, that would tend to increase the fire and panic hazard shall be made from a nonflammable material, or shall be treated and maintained in a flame-retardant condition by means of a flame-retardant solution or process approved by the State Fire Marshal, as set forth in California Code of Regulations, Title 19, Division 1, Chapter 8. Exits, exit lights, fire alarm sending stations, wet standpipe hose cabinets and fire extinguisher locations shall not be concealed, in whole or in part, by any decorative material.

Exceptions:

(a) Cubical curtains and individual patient room window curtains and drapes in Group I, R-2.1, R-3.1 and R-4 occupancies.

(b) Window curtains and drapes within dwelling units of Group R-1 and R-2 occupancies.

(c) Christmas trees within dwelling units of Group R-1 and R-2 occupancies.

806.2 Obstruction of means of egress. The required width of any portion of a means of egress shall not be obstructed by decorative vegetation. Natural cut trees shall not be located within an exit, corridor, or a lobby or vestibule.

806.3 Open flame. Candles and open flames shall not be used on or near decorative vegetation. Natural cut trees shall be kept a distance from heat vents and any open flame or heat-producing devices not less than the height of the tree.

806.4 Electrical fixtures and wiring. The use of unlisted electrical wiring and lighting on natural vegetation, including natural cut trees, shall be prohibited.

SECTION 807—DECORATIVE MATERIALS AND ARTIFICIAL DECORATIVE VEGETATION IN NEW AND EXISTING BUILDINGS

807.1 General. The following requirements shall apply to all occupancies:

1. Furnishings or decorative materials of an explosive or highly flammable character shall not be used.
2. Fire-retardant coatings in existing buildings shall be maintained so as to retain the effectiveness of the treatment under service conditions encountered in actual use.
3. Furnishings or other objects shall not be placed to obstruct exits, access thereto, egress therefrom or visibility thereof.
4. The permissible amount of noncombustible decorative materials shall not be limited.

807.2 Combustible decorative materials. In Groups A, B, E, I, M and R-1 and in dormitories in Group R-2, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings shall comply with Section 807.3 and shall not exceed 10 percent of the specific wall or ceiling area to which such materials are attached.

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Fixed or movable walls and partitions, paneling, wall pads and crash pads applied structurally or for decoration, acoustical correction, surface insulation or other purposes shall be considered to be interior finish, shall comply with Section 803 and shall not be considered decorative materials or furnishings.

Exceptions:

1. In auditoriums in Group A, the permissible amount of curtains, draperies, fabric hangings and similar combustible decorative material suspended from walls or ceilings shall not exceed 75 percent of the aggregate wall area where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, and where the material is installed in accordance with Section 803.15 of the *California Building Code.*
2. In Group R-2 dormitories, within sleeping units and dwelling units, the permissible amount of curtains, draperies, fabric hangings and similar decorative materials suspended from walls or ceilings shall not exceed 50 percent of the aggregate wall areas where the building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.
3. In Group B and M occupancies, the amount of combustible fabric partitions suspended from the ceiling and not supported by the floor shall comply with Section 807.3 and shall not be limited.
4. The 10-percent limit shall not apply to curtains, draperies, fabric hangings and similar combustible decorative materials used as window coverings.

[California Code of Regulations, Title 19, Division 1, §3.08]. Decorative Materials.

In every Group A, E, I, R-1, R-2, R-2.1, R-3.1 and R-4 occupancy, all drapes, hangings, curtains, drops and all other decorative material, including Christmas trees, that would tend to increase the fire and panic hazard shall be made from a nonflammable material, or shall be treated and maintained in a flame-retardant condition by means of a flame-retardant solution or process approved by the State Fire Marshal, as set forth in California Code of Regulations, Title 19, Division 1, Chapter 8. Exits, exit lights, fire alarm sending stations, wet standpipe hose cabinets and fire extinguisher locations shall not be concealed, in whole or in part, by any decorative material.

Exceptions:

(a) Cubical curtains and individual patient room window curtains and drapes in Group I, R-2.1, R-3.1 and R-4 occupancies.

(b) Window curtains and drapes within dwelling units of Group R-1 and R-2 occupancies.

(c) Christmas trees within dwelling units of Group R-1 and R-2 occupancies.

[California Code of Regulations, Title 19, Division 1, §1273.1] Fabrics for Interior Use.

Fabrics as described in California Code of Regulations, Title 19, Division 1, 1272(c) intended for interior use shall be tested in their original condition only and shall meet the requirements for fire resistance outlined in California Code of Regulations, Title 19, Division 1, Section 1273.3.

[California Code of Regulations, Title 19, Division 1, §1273.2] Fabrics for Exterior Use.

Fabrics as described in California Code of Regulations, Title 19, Division 1, 1272(c) intended for exterior use shall meet the requirements for fire resistance outlined in California Code of Regulations, Title 19, Division 1, 1273.3, and, in addition, they shall meet the requirements for fire resistance outlined in California Code of Regulations, Title 19, Division 1, 1237, both in their original state and after accelerated weathering.

807.3 Acceptance criteria and reports. Where required to exhibit improved fire performance, curtains, draperies, fabric hangings and other similar combustible decorative materials suspended from walls or ceilings *(shall be flame resistant in accordance with the provisions set forth in CCR, Title 19, Division 1, Chapter 8.)* shall be tested by an approved agency and meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or exhibit a maximum rate of heat release of 100 kW when tested in accordance with NFPA 289, using the 20 kW ignition source. Reports of test results shall be prepared in accordance with the test method used and furnished to the fire code official upon request.

[California Code of Regulations, Title 19, Division 1, §1321.1] Fabric and Material Certification.

All concerns in whose name an approved flame-resistant fabric or material is registered shall issue approved certificates of flame resistance covering all such products sold for use in occupancies governed by the statutes. Copies shall be furnished to the buyer as well as the State Fire Marshal and the local fire authority of the customer's city. These certificates shall be delivered within 10 days after the product is shipped and shall be completely filled out and signed by an authorized representative of the concern.

In addition to the required description on the reverse side of the certificate as to yardage or quantity, color and kind, notation should be made of the manufacturer's production or lot control number, the purchase order or invoice number, and, where possible, the ultimate location and use.

[California Code of Regulations, Title 19, Division 1, §1324] Job Labeling.

To every article that is treated and to every roll or package of registered approved fabric or material, a small label or tag shall be securely affixed, bearing the following information:

(a) The Seal of Registration of the State Fire Marshal of California.

(b) Name and registration number of the concern responsible for the job or production.

(c) Name of the registered chemical used or the registered fabric or material.

(d) Date the chemical was applied, or the fabric or material was produced.

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(e) The statement, "This article must be re-treated after washing or dry cleaning by systems with soap and water added" (if treated with a "Type II" chemical).

This information may be stamped, printed or stenciled on the article if so desired.

Concerns which treat or manufacture yardage goods may print or stencil their name, or the name of their fabric if registered, on the salvage (at least once every three yards) instead of affixing the label or tag as above.

***[California Code of Regulations, Title 19, Division 1, §1325] Labeling Required**.*

No drape, hanging, curtain, drop or similar decorative material or exterior fabric which has been treated by a registered flame-retardant application concern, either as yardage or after fabrication, or which is made from a registered approved fabric shall be installed after the effective date of these rules and regulations [California Code of Regulations, Title 19, Division 1, Chapter 8] in any place or under any condition governed by Sections 13115 and 13119 of the Health and Safety Code unless such drape, hanging, curtain, drop, or similar decorative material or exterior fabric shall be labeled as required by California Code of Regulations, Title 19, Division 1, Section 1324.

[California Code of Regulations, Title 19, Division 1, §1326] Retreatment.

In cases where instructions are issued by the State Fire Marshal requiring retreatment or replacement of fabrics or materials previously treated with a flame-retardant chemical or registered as an approved fabric or material, the retreatment or replacement shall be made within ten (10) days after date of the order so requiring. A new certificate of flame resistance covering each such retreatment shall be delivered as for an original job as is provided for by California Code of Regulations, Title 19, Division 1, Section 1321. A new sample of the retreated fabric or material shall be attached to the certificate of flame resistance submitted to the State Fire Marshal.

[California Code of Regulations, Title 19, Division 1, §1327] Installation.

The standard fire-resistance tests presume installation of approved registered fabrics in a normal vertical position. Some decorative materials installed otherwise, such as in narrow strips or suspended overhead in a horizontal position, may exhibit different burning characteristics. Since it is not feasible to devise tests for all such installations differing from normal, they must be judged on an individual basis. Where indicated, the State Fire Marshal may perform such additional tests as he deems necessary to ensure adequate fire resistance of materials as installed.

807.4 Artificial decorative vegetation. Artificial decorative vegetation shall comply with this section and the requirements of Sections *807.2* and *807.3*. Natural decorative vegetation shall comply with Section 806.

➡ **Exception:** Testing of artificial vegetation is not required in Group I-2, Group R-2, Group R-3, or Group R-4 occupancies equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1, where such artificial vegetation complies with the following:

1. Wreaths and other decorative items on doors shall not obstruct the door operation and shall not exceed 50 percent of the surface area of the door.
2. Decorative artificial vegetation shall be limited to not more than 30 percent of the wall area to which it is attached.
3. Decorative artificial vegetation not on doors or walls shall not exceed 3 feet (914 mm) in any dimension.

807.4.1 Flammability. Artificial decorative vegetation shall meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701. Meeting such criteria shall be documented and certified by the manufacturer in an approved manner. Alternatively, the artificial decorative vegetation shall be tested in accordance with NFPA 289, using the 20 kW ignition source, and shall have a maximum heat release rate of 100 kW.

807.4.2 Electrical fixtures and wiring on artificial vegetation. The use of unlisted electrical wiring and lighting on artificial decorative vegetation shall be prohibited. The use of electrical wiring and lighting on artificial trees constructed entirely of metal shall be prohibited.

807.5 Occupancy-based requirements. Occupancies shall comply with Sections 807.5.1 through 807.5.6.

807.5.1 Group A. In Group A occupancies, the requirements in Sections 807.5.1.1 through 807.5.1.4 shall apply.

807.5.1.1 Foam plastics. Exposed foam plastic materials and unprotected materials containing foam plastic used for decorative purposes or stage scenery or exhibit booths shall have a maximum heat release rate of 100 kW when tested in accordance with UL 1975, or when tested in accordance with NFPA 289 using the 20 kW ignition source.

Exceptions:

1. Individual foam plastic items or items containing foam plastic where the foam plastic does not exceed 1 pound (0.45 kg) in weight.
2. Cellular or foam plastic shall be allowed for trim in accordance with Section 804.2.

807.5.1.2 Motion picture screens. The screens on which motion pictures are projected in new and existing buildings of Group A shall either meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 or shall comply with the requirements for a Class B interior finish in accordance with Section 803 of the *California Building Code.*

***807.5.1.2.1 Motion picture and television production studio sound stages.** Approved production facilities and production locations with live audiences*.

***807.5.1.2.2 Foam plastics, decorations, textile and film materials.** Foam plastics, textile and film materials and other decorative materials and materials containing foam plastics shall be in accordance with the following:*

1. Exhibit booth construction shall have a maximum heat-release rate of 100 kilowatts when tested in accordance with UL 1975.

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2. *Decorative objects, including but not limited to mannequins, murals and signs, shall have a maximum heat-release rate of 150 kilowatts when tested in accordance with UL 1975.*

   Exception: *When the aggregate area of murals, signs or similar decorative objects occupies less than 10 percent of the floor or wall area, this requirement may be waived by the fire chief.*

3. *Theater, motion picture and television stage settings with or without horizontal projections and simulated caves or caverns shall have a maximum heat-release rate of 100 kilowatts when tested in accordance with UL 1975.*

807.5.1.3 Wood use in places of religious worship. In places of religious worship, wood used for ornamental purposes, trusses, paneling or chancel furnishing shall not be limited.

807.5.1.4 Pyroxylin plastic. Imitation leather or other material consisting of or coated with a pyroxylin or similarly hazardous base shall not be used.

807.5.2 Group E. Group E occupancies shall comply with Sections 807.5.2.1 through 807.5.2.3.

807.5.2.1 Storage in corridors and lobbies. Clothing and personal effects shall not be stored in corridors and lobbies.

Exceptions:

1. Corridors protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Corridors protected by an approved fire alarm system installed in accordance with Section 907.
3. Storage in metal lockers, provided the minimum required egress width is maintained.

807.5.2.2 Artwork in corridors. Artwork and teaching materials shall be limited on the walls of corridors to not more than 20 percent of the wall area.

807.5.2.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than 50 percent of the specific wall area to which they are attached.

807.5.3 Groups I-2 and *R-2.1*. In Group I-2 and *R-2.1* occupancies, combustible decorative materials shall comply with Sections 807.5.3.1 through 807.5.3.4. ⬅

807.5.3.1 Group *R-2.1* within units. In Group *R-2.1* occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, within sleeping units and dwelling units, combustible decorative materials placed on walls shall be limited to not more than 50 percent of the wall area to which they are attached.

807.5.3.2 In Group *R-2.1* for areas other than within units. In Group *R-2.1* occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, combustible decorative materials placed on walls in areas other than within dwelling and sleeping units shall be limited to not more than 30 percent of the wall area to which they are attached.

807.5.3.3 In Groups I-2 *and R-2.1*. In Group I-2 *and R-2.1* occupancies, equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, combustible decorative materials placed on walls shall be limited to not more than 30 percent of the wall area to which they are attached.

807.5.3.4 Other areas in Groups I-2 *and R-2.1*. In Group I-2 *and R-2.1* occupancies, in areas not equipped throughout with an approved automatic sprinkler system, combustible decorative materials shall be of such limited quantities that a hazard of fire development or spread is not present.

807.5.4 Group I-3. In Group I-3, combustible decorative materials are prohibited.

807.5.5 Group I-4. Group I-4 occupancies shall comply with the requirements in Sections 807.5.5.1 through 807.5.5.3.

807.5.5.1 Storage in corridors and lobbies. Clothing and personal effects shall not be stored in corridors and lobbies.

Exceptions:

1. Corridors protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1.
2. Corridors protected by an approved fire alarm system installed in accordance with Section 907.
3. Storage in metal lockers, provided that the minimum required egress width is maintained.

807.5.5.2 Artwork in corridors. Artwork and teaching materials shall be limited on walls of corridors to not more than 20 percent of the wall area.

807.5.5.3 Artwork in classrooms. Artwork and teaching materials shall be limited on walls of classrooms to not more than 50 percent of the specific wall area to which they are attached.

807.5.6 Dormitories in Group R-2. In Group R-2 dormitories, within sleeping units and dwelling units, the combustible decorative materials shall be of limited quantities such that a hazard of fire development or spread is not present.

807.5.7 Group F-1 motion picture and television production studio sound stages, approved production facilities and production locations without live audiences.

807.5.7.1 Foam plastics, decorations, textile and film materials. *Foam plastics, textile and film materials and other decorative materials and materials containing foam plastics shall be in accordance with the following:*

1. *Exhibit booth construction shall have a maximum heat-release rate of 100 kilowatts when tested in accordance with UL 1975.*

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2. *Decorative objects, including but not limited to mannequins, murals and signs, shall have a maximum heat-release rate of 150 kilowatts when tested in accordance with UL 1975.*

   Exception: *When the aggregate area of murals, signs or similar decorative objects occupies less than 10 percent of the floor or wall area, this requirement may be waived by the fire chief.*

3. *Theater, motion picture and television stage settings with or without horizontal projections and simulated caves or caverns shall have a maximum heat-release rate of 100 kilowatts when tested in accordance with UL 1975.*

SECTION 808—FURNISHINGS OTHER THAN UPHOLSTERED FURNITURE AND MATTRESSES OR DECORATIVE MATERIALS IN NEW AND EXISTING BUILDINGS

➡ **808.1 Waste and linen containers in Group I-2, I-3 *and R-2.1* occupancies and ambulatory care facilities.** Waste and linen containers located in Group I-2 *and R-2.1* occupancies and ambulatory care facilities shall comply with Section 304.3.6.

808.2 Signs. Foam plastic signs that are not affixed to interior building surfaces shall have a maximum heat release rate of 150 kW when tested in accordance with UL 1975, or when tested in accordance with NFPA 289 using the 20-kW ignition source.

Exception: Where the aggregate area of foam plastic signs is less than 10 percent of the floor area or wall area of the room or space in which the signs are located, whichever is less, subject to the approval of the fire code official.

[California Code of Regulations, Title 19, Division 1, §3.19(b) and (c) Housekeeping.

Every building or portion of a building governed by California Code of Regulations, Title 19, Division 1 regulations shall be maintained in a neat orderly manner, free from any condition that would create a fire or life hazard or a condition which would add to or contribute to the rapid spread of fire. Provisions shall be made for the proper storage and disposal of waste materials and rubbish consistent with the following:

(b) All combustible waste material and rubbish shall be stored in approved containers or shall be stored in a manner approved by the enforcing agency as being consistent with standard fire prevention practices until such waste material and rubbish is removed from the premises or otherwise disposed of in a proper manner.

(1) Containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) shall comply with the provisions of California Code of Regulations, Title 24, Part 9, Section 304.3.

(2) Wastebaskets and linen containers in Group I-2 and I-3 occupancies shall comply with the provisions of California Code of Regulations, Title 24, Part 9, Section 808.

(c) Approved self-closing metal containers or listed disposal containers by an approved testing or listing agency shall be provided and maintained in all rooms or locations where oily rags, oily waste, paint rags or similar materials subject to spontaneous ignition are used, or are stored temporarily. Such containers shall be emptied daily.

808.3 Combustible lockers. Where lockers constructed of combustible materials are used, the lockers shall be considered to be interior finish and shall comply with Section 803.

Exception: Lockers constructed entirely of wood and noncombustible materials shall be permitted to be used wherever interior finish materials are required to meet a Class C classification in accordance with Section 803.1.2.

808.4 Play structures added to existing buildings. Where play structures that exceed 10 feet (3048 mm) in height or 150 square feet (14 m^2) in area are added inside an existing building, they shall comply with Section 424 of the *California Building Code*.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
901.6			X																				
[T-19 §1.14]				X																			
[T-19 §3.24]				X																			
[T-19 §904 (a)]				X																			
[T-19 §904 (a)(1)]				X																			
[T-19 §904 (b)]				X																			
[T-19 §904.2 (a)]				X																			
[T-19 §904.2 (b)]				X																			
[T-19 §904.2 (h)]				X																			
[T-19 §904.2 (i)]				X																			
901.6.1			X																				
[T-19 §904.1 (a)]				X																			
[T-19 §904.2 (g)]				X																			
Table 901.6.1			X																				
[T-19 §904.1 (b)]				X																			
[T-19 §904.2 (c)]				X																			
[T-19 §904.2 (j)]				X																			
901.7			X																				
[T-19 §904.1 (c)]				X																			
[T-19 §904.2 (d)]				X																			
[T-19 §904.2 (e)]				X																			
[T-19 §904.2 (f)]				X																			
902.1			X																				
[T-19 §902.4 (b)]				X																			
Fire Appliance			X																				
[T-19 §902.9 (a)]				X																			
[T-19 §902.12 (a)]				X																			
[T-19 §902.15 (a)]				X																			
[T-19 §902.18 (a)]				X																			
903.2			X																				
903.2.1.2			X																				
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CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
903.2.6.2			X																				
903.2.7			X																				
903.2.8			X																				
903.2.8.2			X																				
Table 903.2.11.6			X																				
903.2.13 – 903.2.21			X																				
903.3.1.1			X																				
903.3.1.1.1			X																				
903.3.1.1.4			X																				
903.3.1.2			X																				
903.3.1.2.3			X																				
903.3.1.3			X																				
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[T-19 §904.7 (a-c)]				X																			
904.1.1			†																				
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904.6			X																				
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904.7.1			X																				
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904.14			X																				
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CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
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905.3.10			X																				
905.4				X																			
905.5				X																			
905.7.2				X																			
906.1			X																				
[T-19 §3.29 (a-d)]				X																			
[T-19 §565 (a)]				X																			
906.2			X																				
[T-19 §565.1 (a-c)]				X																			
[T-19 §565.2 (a-e)]				X																			
[T-19 §566 (a-f)]				X																			
[T-19 §567.8]				X																			
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[T-19 §574.3]				X																			
[T-19 §574.4]				X																			
[T-19 §575.10]				X																			
[T-19 §591.5]				X																			
[T-19 §596.7 (a)(b)]				X																			
[T-19 §574.5 (a-c)]				X																			
906.2.1			X																				
[T-19 §567 (a-k)]				X																			
[T-19 §568 (a-e)]				X																			
[T-19 §569 (a-c)]				X																			
[T-19 §570 (a-e)]				X																			
[T-19 §571 (a)]				X																			
Table 906.3(1)			X																				
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Table 906.3(2)			X																				
906.3.4			X																				
[T-19 §573 (a-c)]				X																			
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907.1.2			X																				
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CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
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907.2.2			X																				
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CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
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907.2.11.2.6			X																				
907.2.11.3			X																				
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907.2.11.8			X																				
907.2.12			X																				
907.2.13			X																				
907.2.13.1			X																				
907.2.13.1.2			X																				
907.2.23			X																				
907.2.24 – 907.2.25.2			X																				
[T-19 §3.12]				X																			
907.2.26 – 907.2.29.1			X																				
907.3.2			X																				
907.3.2.1			X																				
907.3.2.2			X																				
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Table 907.5.2.3.2			X																				
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907.6.4.3			X																				

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CHAPTER 9 – FIRE PROTECTION AND LIFE SAFETY SYSTEMS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
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[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
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907.6.6			X																				
907.6.6.4			X																				
908.4			X																				
909.5.3			X																				
909.5.3.1			X																				
909.12.1			X																				
909.16			X																				
909.18.9			X																				
910.2.1			X																				
910.3.1			X																				
912.4			X																				
912.6			X																				
912.7			X																				
913.5			X																				
913.6			X																				
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914.3.1.2.1			X																				
914.3.2			X																				
914.3.8			X																				
914.3.8.1			X																				
914.3.8.2			X																				
914.7 – *914.7.1*			X																				
914.7.2.2 – 914.7.2.3			X																				
915.1			X																				
915.2 – 915.2.1			X																				
915.2.3			X																				
915.4.1			X																				
915.4.2			X																				
915.4.3			X																				
915.4.4			X																				
915.5.3			X																				
915.6.1			X																				
915.7			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

9 FIRE PROTECTION AND LIFE SAFETY SYSTEMS

User notes:

About this chapter: Chapter 9 prescribes the minimum requirements for active fire protection equipment systems to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, mass notification, gas detection, controlling smoke and controlling or extinguishing the fire. Generally, the requirements are based on the occupancy, the height and the area of the building because these are the factors that most affect firefighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the *California Building Code*; however, this chapter also contains periodic testing criteria that are not contained in the *California Building Code*. In addition, the special fire protection system requirements based on use and occupancy found in Chapter 4 of the *California Building Code* are duplicated in this chapter as a user convenience.

SECTION 901—GENERAL

901.1 Scope. The provisions of this chapter shall specify where fire protection and life safety systems are required and shall apply to the design, installation, inspection, operation, testing and maintenance of all fire protection and life safety systems.

901.2 Construction documents. The fire code official shall have the authority to require construction documents and calculations for all fire protection and life safety systems and to require permits be issued for the installation, rehabilitation or modification of any fire protection and life safety systems. Construction documents for fire protection and life safety systems shall be submitted for review and approval prior to system installation.

901.2.1 Statement of compliance. Before requesting final approval of the installation, where required by the fire code official, the installing contractor shall furnish a written statement to the fire code official that the subject fire protection or life safety system has been installed in accordance with approved plans and has been tested in accordance with the manufacturer's specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement.

901.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

901.4 Fire protection and life safety systems. Fire protection and life safety systems shall be installed, repaired, operated and maintained in accordance with this code and the *California Building Code*.

901.4.1 Required fire protection and life safety systems. Fire protection and life safety systems required by this code or the *California Building Code* shall be installed, repaired, operated, tested and maintained in accordance with this code. A fire protection or life safety system for which a design option, exception or reduction to the provisions of this code or the *California Building Code* has been granted shall be considered to be a required system.

901.4.2 Nonrequired fire protection and life safety systems. Fire protection and life safety systems or portion thereof not required by this code or the *California Building Code* shall be allowed to be furnished for partial or complete protection provided that such installed systems meet the applicable requirements of this code and the *California Building Code*.

901.4.3 Alterations in buildings and structures. For any alteration within a building or structure, the fire protection and life safety systems shall be extended, altered or augmented to maintain and continue protection within the building or structure. Persons shall not remove or modify any fire protection or life safety system installed or maintained under the provisions of this code or the *California Building Code* without approval from the fire code official.

901.4.4 Fire areas. Where buildings, or portions thereof, are divided into fire areas so as not to exceed the limits established for requiring a fire protection system in accordance with this chapter, such fire areas shall be separated by fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, having a fire-resistance rating of not less than that determined in accordance with Section 707.3.10 of the *California Building Code*.

901.4.5 Additional fire protection systems. In occupancies of a hazardous nature, where special hazards exist in addition to the normal hazards of the occupancy, or where the fire code official determines that access for fire apparatus is unduly difficult, the fire code official shall have the authority to require additional safeguards and fire protection systems. Fire protection and life safety systems required under this section shall be installed in accordance with this code and the applicable referenced standards.

901.4.6 Appearance of equipment. Any device that has the physical appearance of life safety or fire protection equipment but that does not perform that life safety or fire protection function shall be prohibited.

901.4.7 Pump and riser room size. Where provided, fire pump rooms and automatic sprinkler system riser rooms shall be designed with adequate space for all equipment necessary for the installation, as defined by the manufacturer, with sufficient working space around the stationary equipment. Clearances around equipment to elements of permanent construction, including other installed equipment and appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly. Fire

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pump and automatic sprinkler system riser rooms shall be provided with doors and unobstructed passageways large enough to allow removal of the largest piece of equipment.

901.4.7.1 Access. Automatic sprinkler system risers, fire pumps and controllers shall be provided with ready access. Where located in a fire pump room or automatic sprinkler system riser room, the door shall be permitted to be locked provided that the key is available at all times.

901.4.7.2 Marking on access doors. Access doors for automatic sprinkler system riser rooms and fire pump rooms shall be labeled with an approved sign. The lettering shall be in contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of $^3/_8$ inch (10 mm).

901.4.7.3 Environment. Automatic sprinkler system riser rooms and fire pump rooms shall be maintained at a temperature of not less than 40°F (4°C). Heating units shall be permanently installed.

901.4.7.4 Lighting. Permanently installed artificial illumination shall be provided in the automatic sprinkler system riser rooms and fire pump rooms.

901.5 Administration of installation acceptance testing. Fire protection and life safety systems and appurtenances thereto shall be subject to acceptance tests as contained in the installation standards and as approved by the fire code official. The fire code official shall be notified before any required acceptance testing.

901.5.1 Occupancy. It shall be unlawful to occupy any portion of a building or structure until the required fire protection and life safety systems have been tested and approved.

901.6 Inspection, testing and maintenance. Fire protection and life safety systems shall be maintained in an operative condition at all times, and shall be replaced or repaired where defective. Nonrequired fire protection and life safety systems and equipment shall be inspected, tested and maintained or removed in accordance with Section 901.8.

All fire alarm systems, fire detection systems, automatic sprinkler or extinguishing systems, communication systems, and all other equipment, material or systems required by these regulations shall be maintained in an operable condition at all times in accordance with this code and California Code of Regulations, Title 19, Division 1. Upon disruption or diminishment of the fire protective qualities of such equipment, material or systems, immediate action shall be instituted to affect a reestablishment of such equipment, material or systems to their original normal and operational condition.

[California Code of Regulations, Title 19, Division 1, §1.14] Maintenance.

Every fire alarm system or device, sprinkler system, fire extinguisher, fire hose, fire-resistive assembly or any other fire safety assembly, device, material or equipment installed and retained in service in any building or structure subject to California Code of Regulations, Title 19, Division 1 regulations shall be maintained in an operable condition at all times in accordance with California Code of Regulations, Title 19, Division 1 regulations and with their intended use.

[California Code of Regulations, Title 19, Division 1, §3.24] Maintenance of Equipment.

All fire alarm systems, fire detection systems, automatic sprinkler or extinguishing systems, communication systems, and all other equipment, material or systems required by California Code of Regulations, Title 19, Division 1 shall be maintained in an operable condition at all times. Upon disruption or diminishment of the fire protective qualities of such equipment, material or systems, immediate action shall be instituted to affect a reestablishment of such equipment material or systems to their original normal and operational condition.

[California Code of Regulations, Title 19, Division 1, §904(a)] Required Inspection, Testing and Maintenance Frequencies.

(a) All automatic fire extinguishing systems, including systems installed as an alternate to other building requirements, shall be inspected, tested and maintained in accordance with the following frequencies. Local authorities may require more frequent inspection, testing and maintenance and additional procedures.

[California Code of Regulations, Title 19, Division 1, §904(a)(1)] Required Inspection, Testing and Maintenance Frequencies.

(1) Water-based fire protection systems shall be inspected, tested and maintained in accordance with the frequencies required by NFPA 25 (2011 edition) including Annexes A, B, C, D and G as amended by the State of California. (Published as NFPA 25, 2013 California Edition.)

[California Code of Regulations, Title 19, Division 1, §904(b)] Required Inspection, Testing and Maintenance Frequencies.

(b) When proof of the installation date of standpipe systems or automatic fire sprinkler systems cannot be furnished, such systems shall receive initial testing and maintenance by July 1, 1985.

[California Code of Regulations, Title 19, Division 1, §904.2(a)] Testing and Maintenance Requirements.

(a) All testing and maintenance on automatic fire extinguishing systems in accordance with Health & Safety Code Section 13195 shall be performed by those licensed in accordance with Health and Safety Code Section 13196.5.

Exceptions:

(1) The State Fire Marshal may waive, in writing, licensing of fire departments which conduct fire sprinkler and standpipe system testing and maintenance.

(2) Service on fire alarm systems and industrial systems as specified in Health and Safety Code Sections 13196.5(b) and (c) may be conducted without a license.

(3) Testing and maintenance on automatic fire extinguishing systems exempted in writing by the State Fire Marshal, when the building owner or occupant has the staff and equipment to conduct testing and maintenance.

[California Code of Regulations, Title 19, Division 1, §904.2(b)] Testing and Maintenance Requirements.

(b) Any testing and maintenance of automatic fire extinguishing systems shall be performed in accordance with these requirements.

Exceptions:

(1) The State Fire Marshal may waive, in writing, the requirement that testing and maintenance be performed in accordance with these requirements when a licensee can demonstrate that a system cannot functionally be tested and maintained in accordance with the California Code of Regulations, Title 19, Division 1, Chapter 5.

(2) If at any time a licensee encounters a specialized or modified system which cannot be tested and maintained in accordance with California Code of Regulations, Title 19, Division 1, Chapter 5, the licensee shall contact the State Fire Marshal and test and maintain the system as directed.

(A) The intent of this section is to cover automatic fire extinguishing systems as originally designed, installed and approved by the Authority Having Jurisdiction. It is not, however, intended to require that such systems be upgraded to current adopted standards.

[California Code of Regulations, Title 19, Division 1, §904.2(h)] Testing and Maintenance Requirements.

(h) At the time of testing and maintenance, building management shall be consulted to avoid unnecessary disturbance of normal building operation.

[California Code of Regulations, Title 19, Division 1, §904.2(i)] Testing and Maintenance Requirements.

(i) The licensee shall contact the local fire authority having jurisdiction prior to testing and maintenance of a system when required by the local fire authority having jurisdiction to do so.

901.6.1 Standards. Fire protection systems shall be inspected, tested and maintained in accordance with the referenced standards listed in Table 901.6.1 *and California Code of Regulations, Title 19, Division 1, Chapters 3 and 5.*

[California Code of Regulations, Title 19, Division 1, §904.1(a)] Inspection Requirements.

(a) A license shall not be required to perform inspections. Inspections may be conducted by any person designated by the building owner or occupant who has developed competence through training and experience.

[California Code of Regulations, Title 19, Division 1, §904.2(g)] Testing and Maintenance Requirements.

(g) Prior to activating any fire alarm component of an automatic fire extinguishing system, the licensee shall ensure that the licensee is capable of restoring the fire alarm system.

TABLE 901.6.1—FIRE PROTECTION SYSTEM INSPECTION, TESTING AND MAINTENANCE STANDARDS

SYSTEM	STANDARD
Portable fire extinguishers	*California Code of Regulations, Title 19, Division 1, Chapter 3*
Carbon dioxide fire-extinguishing systems	NFPA 12
Halon 1301 fire-extinguishing systems	NFPA 12A
Dry-chemical extinguishing systems	NFPA 17
Wet-chemical extinguishing systems	NFPA 17A
Water-based fire protection systems	*California Code of Regulations, Title 19, Division 1, Chapter 5*
Fire alarm systems	NFPA 72
Fire dampers	NFPA 80
Smoke dampers	NFPA 105
Smoke and heat vents	NFPA 204
Water-mist systems	NFPA 750
Clean-agent extinguishing systems	NFPA 2001
Aerosol fire-extinguishing systems	NFPA 2010

901.6.2 Integrated testing. Where two or more fire protection or life safety systems are interconnected, the intended response of subordinate fire protection and life safety systems shall be verified when required testing of the initiating system is conducted. In addition, integrated testing shall be performed in accordance with Sections 901.6.2.1 and 901.6.2.2.

901.6.2.1 High-rise buildings. For high-rise buildings, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occupancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

901.6.2.2 Smoke control systems. Where a fire alarm system is integrated with a smoke control system as outlined in Section 909, integrated testing shall comply with NFPA 4, with an integrated test performed prior to issuance of the certificate of occu-

pancy and at intervals not exceeding 10 years, unless otherwise specified by an integrated system test plan prepared in accordance with NFPA 4. If an equipment failure is detected during integrated testing, a repeat of the integrated test shall not be required, except as necessary to verify operation of fire protection or life safety functions that are initiated by equipment that was repaired or replaced.

901.6.3 Records. Records of all system inspections, tests and maintenance shall be maintained in accordance with Section 110.3.

[California Code of Regulations, Title 19, Division 1, §904.1(b)] Inspection Requirements.

(b) Records of all inspections shall be retained on the premises by the building or system owner for a period of five years after the next required inspection.

[California Code of Regulations, Title 19, Division 1, §904.2(c)] Testing and Maintenance Requirements.

(c) Records of all testing and maintenance shall be retained on the premises by the building or system owner for a period of five years after the next required test or maintenance.

[California Code of Regulations, Title 19, Division 1, §904.2(j)] Testing and Maintenance Requirements.

(j) It is the responsibility of the contractor, company or licensee to provide a written report of the test and maintenance results to the building owner and the local fire authority having jurisdiction at the completion of the testing and maintenance.

901.6.3.1 Records information. Initial records shall include the name of the installation contractor, type of components installed, manufacturer of the components, location and number of components installed per floor. Records shall include the manufacturers' operation and maintenance instruction manuals. Such records shall be maintained for the life of the installation.

901.7 Systems out of service. Where a required fire protection system is out of service, the fire department and the fire code official shall be notified immediately and, where required by the fire code official, the building shall be either evacuated or an approved fire watch shall be provided for all occupants left unprotected by the shutdown until the fire protection system has been returned to service.

Where utilized, fire watches shall be provided with not less than one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.

Exception: Facilities with an approved notification and impairment management program. The notification and impairment program for water-based fire protection systems shall comply with *California* NFPA 25.

[California Code of Regulations, Title 19, Division 1, §904.1(c)] Inspection Requirements.

(c) The owner or occupant shall promptly correct or repair deficiencies, damaged parts or impairments found while performing the inspection, test and maintenance requirements of this standard. Recalled products shall be replaced or remedied. Such replacement or remedial product shall be installed in accordance with the listing requirements, the manufacturer's instructions and the appropriate NFPA installation standards. A recalled product is a product subject to a statute or administrative regulation specifically requiring the manufacturer, importer, distributor, wholesaler or retailer of a product, or any combination of such entities, to recall the product, or a product voluntarily recalled by a combination of such entities.

[California Code of Regulations, Title 19, Division 1, §904.2(d)] Testing and Maintenance Requirements.

(d) The building or system owner shall ensure immediate correction of any deficiencies noted during the service. A tag or label shall be affixed to a system only after all deficiencies have been corrected. The owner or occupant shall promptly correct or repair deficiencies, damaged parts or impairments found while performing the inspection, test and maintenance requirements of this standard. Recalled products shall be replaced or remedied. Such replacement or remedial product shall be installed in accordance with the listing requirements, the manufacturer's instructions and the appropriate NFPA installation standards. A recalled product is a product subject to a statute or administrative regulation specifically requiring the manufacturer, importer, distributor, wholesaler or retailer of a product, or any combination of such entities, to recall the product, or a product voluntarily recalled by a combination of such entities.

[California Code of Regulations, Title 19, Division 1, §904.2(e)] Testing and Maintenance Requirements.

(e) At the time of testing and maintenance, or at any time parts are replaced, an itemized invoice showing work performed and parts replaced shall be provided by the licensee to the system owner. If testing and maintenance is performed more than thirty (30) days prior to the next required testing and maintenance date, the invoice shall bear a statement indicating the system was tested and maintained early.

[California Code of Regulations, Title 19, Division 1, §904.2(f)] Testing and Maintenance Requirements.

(f) The licensee shall offer to return all replaced parts to the system owner or owner's representative, except those parts that are required to be returned to the manufacturer under conditions of warranty.

901.7.1 Impairment coordinator. The building owner shall assign an impairment coordinator to comply with the requirements of this section. In the absence of a specific designee, the owner shall be considered to be the impairment coordinator.

901.7.2 Tag required. A tag shall be used to indicate that a system, or portion thereof, has been removed from service.

901.7.3 Placement of tag. The tag shall be posted at each fire department connection, system control valve, fire alarm control unit, fire alarm annunciator and fire command center, indicating which system, or part thereof, has been removed from service. The fire code official shall specify where the tag is to be placed.

901.7.4 Preplanned impairment programs. Preplanned impairments shall be authorized by the impairment coordinator. Before authorization is given, a designated individual shall be responsible for verifying that all of the following procedures have been implemented:

1. The extent and expected duration of the impairment have been determined.
2. The areas or buildings involved have been inspected and the increased risks determined.
3. Recommendations have been submitted to management or the building owner/manager.
4. The fire department has been notified.
5. The insurance carrier, the alarm company, the building owner/manager and other authorities having jurisdiction have been notified.
6. The supervisors in the areas to be affected have been notified.
7. A tag impairment system has been implemented.
8. Necessary tools and materials have been assembled on the impairment site.

901.7.5 Emergency impairments. Where unplanned impairments occur, appropriate emergency action shall be taken to minimize potential injury and damage. The impairment coordinator shall implement the steps outlined in Section 901.7.4.

901.7.6 Restoring systems to service. Where impaired equipment is restored to normal working order, the impairment coordinator shall verify that all of the following procedures have been implemented:

1. Necessary inspections and tests have been conducted to verify that affected systems are operational.
2. Supervisors have been advised that protection is restored.
3. The fire department has been advised that protection is restored.
4. The building owner/manager, insurance carrier, alarm company and other involved parties have been advised that protection is restored.
5. The impairment tag has been removed.

901.8 Removal of or tampering with equipment. It shall be unlawful for any person to remove, tamper with or otherwise disturb any fire protection or life safety system required by this code except for the purposes of extinguishing fire, training, recharging or making necessary repairs or where approved by the fire code official.

901.8.1 Removal of or tampering with appurtenances. Locks, gates, doors, barricades, chains, enclosures, signs, tags or seals that have been installed by or at the direction of the fire code official shall not be removed, unlocked, destroyed, tampered with or otherwise vandalized in any manner.

901.8.2 Removal of existing occupant-use hose lines. The fire code official is authorized to permit the removal of existing occupant-use hose lines where both of the following conditions exist:

1. The hose line would not be utilized by trained personnel or the fire department.
2. The remaining outlets are compatible with local fire department fittings.

901.9 Termination of monitoring service. For fire alarm systems required to be monitored by this code, notice shall be made to the fire code official whenever alarm monitoring services are terminated. Notice shall be made in writing by the provider of the monitoring service being terminated.

901.10 Recall of fire protection components. Any fire protection system component regulated by this code that is the subject of a voluntary or mandatory recall under federal law shall be replaced with approved, listed components in compliance with the referenced standards of this code. The fire code official shall be notified in writing by the building owner when the recalled component parts have been replaced.

SECTION 902—DEFINITIONS

902.1 Definitions. The following terms are defined in Chapter 2:

ALARM NOTIFICATION APPLIANCE.

ALARM SIGNAL.

ALARM VERIFICATION FEATURE.

ANNUNCIATOR.

AUDIBLE ALARM NOTIFICATION APPLIANCE.

AUTOMATIC.

AUTOMATIC FIRE-EXTINGUISHING SYSTEM.

AUTOMATIC SMOKE DETECTION SYSTEM.

AUTOMATIC SPRINKLER SYSTEM.

AUTOMATIC WATER MIST SYSTEM.

AVERAGE AMBIENT SOUND LEVEL.

CARBON DIOXIDE EXTINGUISHING SYSTEM.

CLEAN AGENT.

COMMERCIAL MOTOR VEHICLE.

CONSTANTLY ATTENDED LOCATION.

DELUGE SYSTEM.

DETECTOR, HEAT.

DRY-CHEMICAL EXTINGUISHING AGENT.

ELEVATOR GROUP.

EMERGENCY ALARM SYSTEM.

EMERGENCY VOICE/ALARM COMMUNICATIONS.

[California Code of Regulations, Title 19, Division 1, §902.4(b)] "E" Definitions

(b) Engineered Fixed Extinguishing System. A system which is custom designed for a particular hazard, using components which are approved or listed only for their broad performance characteristics. Components may be arranged into a variety of configurations. These systems shall include but not be limited to:

(1) Dry chemical systems

(2) Carbon dioxide systems

(3) Halogenated agent systems

(4) Steam systems

(5) High expansion foam systems

(6) Foam extinguishing systems

(7) Liquid agent systems

(8) Clean agent systems

FIRE ALARM BOX, MANUAL.

FIRE ALARM CONTROL UNIT.

FIRE ALARM SIGNAL.

FIRE ALARM SYSTEM.

FIRE APPLIANCE [SFM] *is apparatus or equipment provided or installed for use in the event of an emergency.*

FIRE AREA.

FIRE DETECTOR, AUTOMATIC.

FIRE PROTECTION SYSTEM.

FIRE SAFETY FUNCTIONS.

FIXED BASE OPERATOR (FBO).

FOAM-EXTINGUISHING SYSTEM.

GAS DETECTION SYSTEM.

HALOGENATED EXTINGUISHING SYSTEM.

IMPAIRMENT COORDINATOR.

INITIATING DEVICE.

[California Code of Regulations, Title 19, Division 1, §902.9(a)] "I" Definitions.

(a) Inspection. A visual examination of a system or portion thereof to verify that it appears to be in operating condition and is free of physical damage.

LIFE SAFETY SYSTEMS.

MANUAL FIRE ALARM BOX.

MULTIPLE-STATION ALARM DEVICE.

MULTIPLE-STATION SMOKE ALARM.

[California Code of Regulations, Title 19, Division 1, §902.12(a)] "M" Definitions.

(a) Maintenance. Work performed to keep equipment operable or to make repairs.

NOTIFICATION ZONE.

NUISANCE ALARM.

[California Code of Regulations, Title 19, Division 1, §902.15(a)] "P" Definitions.

(a) Pre-engineered Fixed Extinguishing System. A system where the number of components and their configurations are included in the description of the systems approval and listing. These systems shall include but not be limited to:

(1) Dry chemical systems

(2) Carbon dioxide systems

(3) Halogenated agent systems

(4) Liquid agent systems

(5) Clean agent systems

PRIVATE GARAGE.

RECORD DRAWINGS.

SINGLE-STATION SMOKE ALARM.

SLEEPING UNIT.

SMOKE ALARM.

SMOKE DETECTOR.

STANDPIPE, TYPES OF.

Automatic dry.

Automatic wet.

Manual dry.

Manual wet.

Semiautomatic dry.

STANDPIPE SYSTEM, CLASSES OF.

Class I system.

Class II system.

Class III system.

SUPERVISING STATION.

SUPERVISORY SERVICE.

SUPERVISORY SIGNAL.

SUPERVISORY SIGNAL-INITIATING DEVICE.

[California Code of Regulations, Title 19, Division 1, §902.18(a)] "S" Definitions.

(a) Service. The performance of testing and maintenance on an automatic fire extinguishing system.

TIRES, BULK STORAGE OF.

TRANSIENT AIRCRAFT.

TROUBLE SIGNAL.

VISIBLE ALARM NOTIFICATION APPLIANCE.

WET-CHEMICAL EXTINGUISHING AGENT.

WIRELESS PROTECTION SYSTEM.

ZONE.

ZONE, NOTIFICATION.

SECTION 903—AUTOMATIC SPRINKLER SYSTEMS

903.1 General. Automatic sprinkler systems shall comply with this section.

903.1.1 Alternative protection. Alternative automatic fire-extinguishing systems complying with Section 904 shall be permitted instead of automatic sprinkler system protection where recognized by the applicable standard and approved by the fire code official.

903.2 Where required. Approved automatic sprinkler systems in new buildings and structures shall be provided in the locations described in Sections 903.2.1 through 903.2.12 *and Sections 903.2.14 through 903.2.21.*

Exception: Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries not required to have an automatic sprinkler system by Section 1207 for energy storage systems and standby engines, provided that those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or not less than 2-hour horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

903.2.1 Group A. An automatic sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies as provided in this section.

903.2.1.1 Group A-1. An automatic sprinkler system shall be provided throughout stories containing Group A-1 occupancies and throughout all stories from the Group A-1 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m^2).

2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
4. The fire area contains a multiple-theater complex.

903.2.1.2 Group A-2. An automatic sprinkler system shall be provided throughout stories containing Group A-2 occupancies and throughout all stories from the Group A-2 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (464 m^2).
2. The fire area has an occupant load of 100 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
4. *The structure exceeds 5,000 square feet (465 m^2), contains more than one fire area containing a Group A-2 occupancy, and is separated into two or more buildings by fire walls of not less than 4-hour fire-resistance rating without openings.*

903.2.1.3 Group A-3. An automatic sprinkler system shall be provided throughout stories containing Group A-3 occupancies and throughout all stories from the Group A-3 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m^2).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.
4. *The structure exceeds 12,000 square feet (1155 m^2), contains more than one fire area containing exhibition and display rooms, and is separated into two or more buildings by fire walls of not less than 4-hour fire-resistance rating without openings.*

903.2.1.4 Group A-4. An automatic sprinkler system shall be provided throughout stories containing Group A-4 occupancies and throughout all stories from the Group A-4 occupancy to and including the levels of exit discharge serving that occupancy where one of the following conditions exists:

1. The fire area exceeds 12,000 square feet (1115 m^2).
2. The fire area has an occupant load of 300 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.

903.2.1.5 Group A-5. An automatic sprinkler system shall be provided for all enclosed Group A-5 accessory use areas in excess of 1,000 square feet (93 m^2).

903.2.1.5.1 Spaces under grandstands or bleachers. Enclosed spaces under grandstands or bleachers shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 where either of the following exist:

1. The enclosed area is 1,000 square feet (93 m^2) or less and is not constructed in accordance with Section 1030.1.1.1.
2. The enclosed area exceeds 1,000 square feet (93 m^2).

903.2.1.6 Assembly occupancies on roofs. Where an occupied roof has an assembly occupancy with an occupant load exceeding 100 for Group A-2 and 300 for other Group A occupancies, all floors between the occupied roof and the level of exit discharge shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Exception: Open parking garages of Type I or Type II construction.

903.2.1.7 Multiple fire areas. An automatic sprinkler system shall be provided where multiple fire areas of Group A-1, A-2, A-3 or A-4 occupancies share exit or exit access components and the combined occupant load of these fire areas is 300 or more.

903.2.2 Group B. An automatic sprinkler system shall be provided for Group B occupancies as required in Sections 903.2.2.1 and 903.2.2.2.

903.2.2.1 Ambulatory care facilities. An automatic sprinkler system shall be installed throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are incapable of self-preservation.
2. One or more care recipients that are incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor as well as all floors below where such care is provided, and all floors between the level of ambulatory care and the nearest level of exit discharge, the level of exit discharge, and all floors below the level of exit discharge.

Exception: Floors classified as an open parking garage are not required to be sprinklered.

903.2.2.2 Laboratories involving research and development or testing. An automatic sprinkler system shall be installed throughout the fire areas utilized for the research and development or testing of lithium-ion or lithium metal batteries.

903.2.3 Group E. An automatic sprinkler system shall be provided for Group E occupancies as follows:

1. Throughout all Group E fire areas greater than 12,000 square feet (1115 m^2) in area.
2. The Group E fire area is located on a floor other than a level of exit discharge serving such occupancies.

Exception: In buildings where every classroom has not fewer than one exterior exit door at ground level, an automatic sprinkler system is not required in any area below the lowest level of exit discharge serving that area.

3. The Group E fire area has an occupant load of 300 or more.
4. *In rooms or areas with special hazards such as laboratories, vocational shops and other such areas where hazardous materials in quantities not exceeding the maximum allowable quantity are used or stored.*
5. *Throughout any Group E structure greater than 12,000 square feet (1115 m^2) in area, which contains more than one fire area, and which is separated into two or more buildings by fire walls of not less than 4-hour fire-resistance rating without openings.*
6. *For public school state-funded construction projects see Section 903.2.19.*
7. *For public school campuses, Kindergarten through 12th grade, see Section 903.2.20.*

903.2.4 Group F-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group F-1 occupancy where one of the following conditions exists:

1. A Group F-1 fire area exceeds 12,000 square feet (1115 m^2).
2. A Group F-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group F-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group F-1 occupancy is used to manufacture lithium-ion or lithium metal batteries.
5. A Group F-1 occupancy is used to manufacture vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

903.2.4.1 Woodworking operations. An automatic sprinkler system shall be provided throughout all Group F-1 occupancy fire areas that contain woodworking operations in excess of 2,500 square feet (232 m^2) in area that generate finely divided combustible waste or use finely divided combustible materials. ***[SFM]*** *A fire wall of less than 4-hour fire-resistance rating without openings, or any fire wall with openings, shall not be used to establish separate fire areas.*

903.2.4.2 Group F-1 distilled spirits. An automatic sprinkler system shall be provided throughout a Group F-1 fire area used for the manufacture of distilled spirits.

903.2.4.3 Group F-1 upholstered furniture or mattresses. An automatic sprinkler system shall be provided throughout a Group F-1 fire area that exceeds 2,500 square feet (232 m^2) used for the manufacture of upholstered furniture or mattresses.

903.2.5 Group H. Automatic sprinkler systems shall be provided in high-hazard occupancies as required in Sections 903.2.5.1 through 903.2.5.3.

903.2.5.1 General. An automatic sprinkler system shall be installed in Group H occupancies.

903.2.5.2 Group H-5 occupancies. An automatic sprinkler system shall be installed throughout buildings containing Group H-5 occupancies. The design of the automatic sprinkler system shall be not less than that required under the *California Building Code* for the occupancy hazard classifications in accordance with Table 903.2.5.2.

Where the design area of the automatic sprinkler system consists of a corridor protected by one row of sprinklers, the maximum number of sprinklers required to be calculated is 13.

TABLE 903.2.5.2—GROUP H-5 AUTOMATIC SPRINKLER SYSTEM DESIGN CRITERIA

LOCATION	OCCUPANCY HAZARD CLASSIFICATION
Fabrication areas	Ordinary Hazard Group 2
Service corridors	Ordinary Hazard Group 2
Storage rooms without dispensing	Ordinary Hazard Group 2
Storage rooms with dispensing	Extra Hazard Group 2
Corridors	Ordinary Hazard Group 2

903.2.5.3 Pyroxylin plastics. An automatic sprinkler system shall be provided in buildings, or portions thereof, where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg).

903.2.5.4 Group H occupancies located on the 11th story and above. *The fire sprinkler system shall be designed and zoned to provide separate indication upon water-flow for each side of the 2-hour fire-smoke barrier on the 11th story and above.*

903.2.6 Group I. An automatic sprinkler system shall be provided throughout buildings with a Group I fire area.

Exceptions:

1. *Those areas exempted by Section 407.6 of the California Building Code.*
2. *Pursuant to Health and Safety Code Section 13113 (d), Group I-2 occupancies, or any alterations thereto, located in Type IA construction in existence on March 4, 1972.*

903.2.6.1 Group I-2. *An existing, unsprinklered Group I-2, nurses' station open to fire-resistive exit access corridors shall be protected by an automatic sprinkler system located directly above the nurses' station. It shall be permitted to connect the automatic sprinkler system to the domestic water service.*

903.2.6.2 Group I-3. *Every building, or portion thereof, where inmates* or persons *are* in custody *or restrained shall be protected by an automatic sprinkler system conforming to NFPA 13. The main sprinkler control valve or valves and all other control valves in the system shall be locked in the open position and electrically supervised so that at least an audible and visual alarm will sound at a constantly attended location when valves are closed. The sprinkler branch piping serving cells may be embedded in the concrete construction.*

903.2.7 Group M. An automatic sprinkler system shall be provided throughout buildings containing a Group M occupancy where one of the following conditions exists:

1. A Group M fire area exceeds 12,000 square feet (1115 m^2).
2. A Group M fire area is located more than three stories above grade plane.
3. The combined area of all Group M fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. ***[SFM]*** *The structure exceeds 24,000 square feet (465 m^2), contains more than one fire area containing a Group M occupancy, and is separated into two or more buildings by fire walls of not less than 4-hour fire-resistance rating without openings.*

903.2.7.1 High-piled storage. An automatic sprinkler system shall be provided as required in Chapter 32 in all buildings of Group M where storage of merchandise is in high-piled or rack storage arrays.

903.2.7.2 Group M upholstered furniture or mattresses. An automatic sprinkler system shall be provided throughout a Group M fire area where the area used for the display and sale of upholstered furniture or mattresses exceeds 5,000 square feet (464 m^2).

903.2.7.3 Lithium-ion or lithium metal battery storage. An automatic sprinkler system shall be provided in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries by Section 320 or Chapter 32.

903.2.8 Group R. An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.

Exceptions:

1. *Existing Group R-3 occupancies converted to Group R-3.1 occupancies not housing bedridden clients, not housing nonambulatory clients above the first floor, and not housing clients above the second floor.*
2. *Existing Group R-3 occupancies converted to Group R-3.1 occupancies housing only one bedridden client and complying with Section 435.8.3.3 of the California Building Code.*
3. *Pursuant to Health and Safety Code, Section 13113, occupancies housing ambulatory children only, none of whom are mentally ill children or children with intellectual disabilities, and the buildings or portions thereof in which such children are housed are not more than two stories in height, and buildings or portions thereof housing such children have an automatic fire alarm system activated by approved smoke detectors.*
4. *Pursuant to Health and Safety Code, Section 13143.6, occupancies licensed for protective social care which house ambulatory clients only, none of whom is a child (under the age of 18 years), or who is elderly (65 years of age or over).*

   When not used in accordance with area or height increases for automatic fire sprinklers allowed in the California Building Code, an automatic sprinkler system installed in accordance with Section 903.3.1.2 shall be allowed in Group R-2.1 occupancies.

   An automatic sprinkler system designed in accordance with Section 903.3.1.3 shall not be utilized in Group R-2.1 or R-4 occupancies.

903.2.8.1 Group R-3. An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in Group R-3 occupancies.

903.2.8.2 ***Reserved.***

➡ **903.2.8.3 Care facilities.** An automatic sprinkler system installed in accordance with Section 903.3.1.3 shall be permitted in care facilities with five or fewer individuals in a single-family dwelling.

903.2.9 Group S-1. An automatic sprinkler system shall be provided throughout all buildings containing a Group S-1 occupancy where one of the following conditions exists:

1. A Group S-1 fire area exceeds 12,000 square feet (1115 m^2).
2. A Group S-1 fire area is located more than three stories above grade plane.
3. The combined area of all Group S-1 fire areas on all floors, including any mezzanines, exceeds 24,000 square feet (2230 m^2).
4. A Group S-1 fire area used for the storage of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m^2).
5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m^2).

903.2.9.1 Repair garages. An automatic sprinkler system shall be provided throughout all buildings used as repair garages in accordance with Section 406.8 of the *California Building Code*, as shown:

1. Buildings having two or more stories above grade plane, including basements, with a fire area containing a repair garage exceeding 10,000 square feet (929 m^2).

2. Buildings not more than one story above grade plane, with a fire area containing a repair garage exceeding 12,000 square feet (1115 m^2).
3. Buildings with repair garages servicing vehicles parked in basements.
4. A Group S-1 fire area used for the repair of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m^2).
5. A Group S-1 fire area used for the storage of lithium-ion or lithium metal powered vehicles where the fire area exceeds 500 square feet (46.4 m^2).

903.2.9.2 Bulk storage of tires. Buildings and structures where the area for the storage of tires exceeds 20,000 cubic feet (566 m^3) shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

903.2.9.3 Group S-1 distilled spirits or wine. An automatic sprinkler system shall be provided throughout a Group S-1 fire area used for the bulk storage of distilled spirits or wine.

903.2.9.4 Group S-1 upholstered furniture and mattresses. An automatic sprinkler system shall be provided throughout a Group S-1 fire area where the area used for the storage of upholstered furniture or mattresses exceeds 2,500 square feet (232 m^2).

Exception: Self-service storage facilities not greater than one story above grade plane where all storage spaces can be accessed directly from the exterior.

903.2.10 Group S-2 parking garages. An automatic sprinkler system shall be provided throughout buildings classified as parking garages where any of the following conditions exist:

1. Where the fire area of the enclosed parking garage, in accordance with Section 406.6 of the *California Building Code*, exceeds 12,000 square feet (1115 m^2).
2. Where the enclosed parking garage, in accordance with Section 406.6 of the *California Building Code*, is located beneath other groups.

   Exception: Enclosed parking garages located beneath Group R-3 occupancies.
3. Where the fire area of the open parking garage, in accordance with Section 406.5 of the *California Building Code*, exceeds 48,000 square feet (4460 m^2).

903.2.10.1 Commercial parking garages. An automatic sprinkler system shall be provided throughout buildings used for storage of commercial motor vehicles where the fire area exceeds 5,000 square feet (464 m^2).

903.2.10.2 Mechanical-access enclosed parking garages. An approved automatic sprinkler system shall be provided throughout buildings used for the storage of motor vehicles in a mechanical-access enclosed parking garage. The portion of the building that contains the mechanical-access enclosed parking garage shall be protected with a specially engineered automatic sprinkler system.

903.2.11 Specific buildings areas and hazards. In all occupancies other than Group U, an automatic sprinkler system shall be installed for building design or hazards in the locations set forth in Sections 903.2.11.1 through 903.2.11.6.

903.2.11.1 Stories without openings. An automatic sprinkler system shall be installed throughout all stories, including basements, of all buildings where the floor area exceeds 1,500 square feet (139 m^2) and where the story does not comply with the following criteria for exterior wall openings:

1. Openings below grade that lead directly to ground level by an exterior stairway complying with Section 1011 or an outside ramp complying with Section 1012. Openings shall be located in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm).
2. Openings entirely above the adjoining ground level totaling not less than 20 square feet (1.86 m^2) in each 50 linear feet (15 240 mm), or fraction thereof, of exterior wall in the story on not fewer than one side. The required openings shall be distributed such that the lineal distance between adjacent openings does not exceed 50 feet (15 240 mm). The height of the bottom of the clear opening shall not exceed 44 inches (1118 mm) measured from the floor.

903.2.11.1.1 Opening dimensions and access. Openings shall have a minimum dimension of not less than 30 inches (762 mm). *Access* to such openings shall be provided for the fire department from the exterior and shall not be obstructed in a manner such that firefighting or rescue cannot be accomplished from the exterior.

903.2.11.1.2 Openings on one side only. Where openings in a story are provided on only one side and the opposite wall of such story is more than 75 feet (22 860 mm) from such openings, the story shall be equipped throughout with an approved automatic sprinkler system, or openings shall be provided on not fewer than two sides of the story.

903.2.11.1.3 Basements. Where any portion of a basement is located more than 75 feet (22 860 mm) from openings required by Section 903.2.11.1, or where walls, partitions or other obstructions are installed that restrict the application of water from hose streams, the basement shall be equipped throughout with an approved automatic sprinkler system.

903.2.11.2 Rubbish and linen chutes. An automatic sprinkler system shall be installed at the top of rubbish and linen chutes and in their terminal rooms. Chutes shall have additional sprinkler heads installed at alternate floors and at the lowest intake. Where a rubbish chute extends through a building more than one floor below the lowest intake, the extension shall have sprinklers installed that are recessed from the drop area of the chute and protected from freezing in accordance with Section

903.3.1.1. Such sprinklers shall be installed at alternate floors, beginning with the second level below the last intake and ending with the floor above the discharge. Access to sprinklers in chutes shall be provided for servicing.

903.2.11.3 Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout buildings that have one or more stories with an occupant load of 30 or more located 55 feet (16 764 mm) or more above the lowest level of fire department vehicle access, measured to the finished floor.

Exception: Occupancies in Group F-2.

903.2.11.4 Ducts conveying hazardous exhausts. Where required by the *California Mechanical Code*, automatic sprinklers shall be provided in ducts conveying hazardous exhaust or flammable or combustible materials.

Exception: Ducts where the largest cross-sectional diameter of the duct is less than 10 inches (254 mm).

903.2.11.5 Commercial cooking operations. An automatic sprinkler system shall be installed in commercial kitchen exhaust hood and duct systems where an automatic sprinkler system is used to comply with Section 904.

903.2.11.6 Other required fire protection systems. In addition to the requirements of Section 903.2, the provisions indicated in Table 903.2.11.6 require the installation of a fire protection system for certain buildings and areas.

TABLE 903.2.11.6—ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS

SECTION	SUBJECT
320.2	Lithium-ion and lithium metal battery storage
903.2.10.2	Mechanical-access enclosed parking garages
914.2.1	Covered and open mall buildings
914.3.1	High-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access*
914.4.1	Atriums
914.5.1	Underground structures
914.6.1	Stages
914.7.1	Special amusement areas
914.8.2	Airport traffic control towers
914.8.3, 914.8.6	Aircraft hangars
914.9	Flammable finishes
914.10	Drying rooms
914.11.1	Ambulatory care facilities
1030.6.2.3	Smoke-protected assembly seating
1103.5.1	Existing Group A occupancies
1103.5.5	Pyroxylin plastic storage in existing buildings
1103.5.2	Existing Group I-2 occupancies
1103.5.3	Existing Group I-2, Condition 2 occupancies
1103.5.5	Pyroxylin plastics
Table 1206.9, Table 1206.10, Table 1207.7, Table 1207.8	Stationary and mobile energy storage systems
2108.2	Dry cleaning plants
2108.3	Dry cleaning machines
2309.3.1.5.2	Hydrogen motor fuel-dispensing area canopies
2404.4	Spray finishing in Group A, E, I or R
2404.6	Spray booths and spray rooms
2405.2	Dip-tank rooms in Group A, I or R
2405.4.1	Dip tanks
2405.9.4	Hardening and tempering tanks
2703.10	HPM facilities
2703.10.1.1	HPM workstation exhaust
2703.10.2	HPM gas cabinets and exhausted enclosures
2703.10.3	HPM exit access corridor
2703.10.4	HPM exhaust ducts
2703.10.4.1	HPM noncombustible ducts
2703.10.4.2	HPM combustible ducts

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TABLE 903.2.11.6—ADDITIONAL REQUIRED FIRE PROTECTION SYSTEMS—continued	
SECTION	**SUBJECT**
2807.3	Lumber production conveyor enclosures
2808.7	Recycling facility conveyor enclosures
3006.1	Class A and B ovens
3006.2	Class C and D ovens
Table 3206.2	Storage fire protection
3206.4	Storage
3210.1.1	Record storage over 12 feet
3704.5	Storage of more than 1,000 cubic feet of loose combustible fibers
5003.8.4.1	Gas rooms
5003.8.5.3	Exhausted enclosures
5004.5	Indoor storage of hazardous materials
5005.1.8	Indoor dispensing of hazardous materials
5104.4.1	Aerosol product warehouses
5106.3.2	Aerosol display and merchandising areas
5306.2.1	Exterior medical gas storage room
5306.2.2	Interior medical gas storage room
5306.2.3	Medical gas storage cabinet
5606.5.2.1	Storage of smokeless propellant
5606.5.2.3	Storage of small arms primers
5704.3.7.5.1	Flammable and combustible liquid storage rooms
5704.3.8.4	Flammable and combustible liquid storage warehouses
5705.3.7.3	Flammable and combustible liquid Group H-2 or H-3 areas
6004.1.2	Gas cabinets for highly toxic and toxic gas
6004.1.3	Exhausted enclosures for highly toxic and toxic gas
6004.2.2.6	Gas rooms for highly toxic and toxic gas
6004.3.3	Outdoor storage for highly toxic and toxic gas
6504.1.1	Pyroxylin plastic storage cabinets
6504.1.3	Pyroxylin plastic storage vaults
6504.2	Pyroxylin plastic storage and manufacturing
California Building Code Section 440	*Horse racing stables*
California Building Code Section 441	*Pet kennels*
California Building Code Section 449	*Public libraries*
For SI: 1 cubic foot = 0.023 m^3.	

903.2.12 During construction. Automatic sprinkler systems required during construction, alteration and demolition operations shall be provided in accordance with Section 3307.

903.2.13 Reserved.

903.2.14 Motion picture and television production studio sound stages, approved production facilities and production locations.

903.2.14.1 Existing Sound Stages and Approved Production Facilities. *All existing sound stages and approved production facilities equipped with an automatic fire sprinkler system shall be maintained in accordance with the provisions in this chapter.*

903.2.14.2 New sound stages. *All new sound stages shall be equipped with an approved automatic fire sprinkler system. The system shall be installed in accordance with the provisions of the California Fire Code, Chapter 9, and shall meet the minimum design requirements of an Extra Hazard, Group 2 system.*

903.2.15 Automatic sprinkler system – existing high-rise buildings. *Regardless of any other provisions of these regulations, every existing high-rise building of Type II-B, Type III-B or Type V-B construction shall be provided with an approved automatic sprinkler system conforming to NFPA 13.*

903.2.15.1 Existing R-1 and R-2 high-rise buildings fire-extinguishing systems. *Automatic fire-extinguishing systems installed in any existing high-rise structure in which a Group R-1 or a Group R-2 occupancy is located shall have an approved flow indicator electrically interconnected to the required fire alarm system.*

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903.2.16 Group L occupancies. *An automatic sprinkler system shall be installed throughout buildings housing Group L occupancies. Sprinkler systems for Group L occupancy shall be designed for the square footage area of the Group L occupancy based on an area of sprinkler operation of 2,500 square feet (232 m^2) and design density of 0.20 gpm/sf.*

In mixed occupancies, portions of floors with Group L occupancies, but not classified as Group L, shall be provided with a sprinkler protection system per NFPA 13.

903.2.16.1 Group L occupancies located on the 11th story and above. *The automatic sprinkler system shall be designed and zoned to provide separate indication upon water-flow for each side of the 2-hour fire-smoke barrier on the 11th story and above.*

903.2.17 Fixed guideway and passenger rail transit systems.

903.2.17.1 Automatic sprinkler system. *An automatic sprinkler system shall be installed in all stations of fixed guideway transit systems.*

Exceptions:

1. *Guideways when the closest sprinkler heads to the guideway are within 3 feet (914 mm) of the edge, over the platform and spaced 6 feet (1829 mm) on center, parallel to the guideway.*
2. *Station agent booths not exceeding 150 square feet (13.9 m^2) in area, when provided with an approved smoke detector connected to the building fire alarm system.*
3. *Power substations.*
4. *Machinery rooms, electrical rooms and train control rooms protected by an approved automatic fixed fire-extinguishing system.*
5. *Open stations.*
6. *Station platform areas open to three or more sides.*

903.2.17.2 Station guideway deluge system. *Underground stations and stations in open cuts with walls 5 feet (1524 mm) above the top of the running rail and with a raised platform shall be provided with an under-vehicle guideway manually activated deluge sprinkler system. In open cut stations, such system shall be provided in guideways which are situated between a raised platform edge and a retaining wall.*

903.2.17.2.1 *Systems shall be provided along the entire length of track at each station platform.*

903.2.17.2.2 *Deluge nozzles with caps shall be located in the approximate center of track with spacing designed to completely wet the undersides of the vehicle at the applied density.*

903.2.17.2.3 *System density shall be a minimum of 0.19 gallon per minute (gpm) per square foot (0.72 L/m per m^2) for the design area. When more than one zone is provided, two adjacent zones are required to be considered operating for calculating purposes.*

903.2.17.2.4 *Deluge systems shall be directly connected to a water supply capable of supplying the required flow rate for a minimum 30-minute duration.*

903.2.17.2.5 *Controls or manually operable valves shall be in a location acceptable to the Fire Code Official. All deluge systems shall be monitored by the station fire alarm system.*

903.2.17.2.6 *Each valve shall be monitored by a separate circuit. The alarm panel shall be located in an area normally occupied by station personnel or signals shall be transmitted to the operations control center (OCC).*

903.2.18 Group U private garages and carports accessory to Group R-3 occupancies. *Carports with habitable space above and attached garages, accessory to Group R-3 occupancies, shall be protected by residential fire sprinklers in accordance with this section. Residential fire sprinklers shall be connected to, and installed in accordance with, an automatic residential fire sprinkler system that complies with Section R309 of the California Residential Code or with NFPA 13D. Fire sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a minimum density of 0.05 gpm/ft^2 (2.04 mm/min) over the area of the garage and/or carport, but not to exceed two sprinklers for hydraulic calculation purposes. Garage doors shall not be considered obstructions with respect to sprinkler placement.*

Exception: *An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing carports and/or garages that do not have an automatic residential fire sprinkler system installed in accordance with this section.*

903.2.19 Public school state-funded construction projects for kindergarten through 12th grade — automatic sprinkler system requirements.

903.2.19.1 New public school campus. *An automatic sprinkler system shall be provided in all occupancies. The provisions of this section shall apply to any public school project consisting of one or more buildings on a new school campus and receiving state funds pursuant to Leroy F. Greene School Facilities Act of 1998, California Education Code, Sections 17070.10 through 17079. For purposes of this section, new campus refers to a school site, where an application for construction of original buildings was made to DSA on or after July 1, 2002.*

An automatic fire sprinkler system is not required in locations identified in Section 903.2.20.

903.2.19.1.1 *Sprinklers shall be installed in spaces where the ceiling creates a "ceiling-plenum" or the space above the ceiling is utilized for environmental air.*

903.2.19.1.2 Fire-resistive substitution for new campus. *A new public school campus shall be entitled to include in the design and construction documents all of the applicable fire-resistive construction substitutions as permitted by this code.*

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903.2.20 Public school campuses. *An automatic fire sprinkler system is not required to be provided in the following locations on Kindergarten through 12th grade.*

1. *A relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.*
2. *Detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:*

   Concession Stand
   Press Box
   Restroom Facilities
   Shade Structure
   Snack Bar
   Storage Building
   Ticket Booth

903.2.21 Required exterior entrance covers. *An automatic sprinkler system shall be provided throughout covered exterior entrances required by California Building Code Section 11B-206.4.10 or Section 1224.33.2.1.*

903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with Sections 903.3.1 through 903.3.8.

903.3.1 Standards. Automatic sprinkler systems shall be designed and installed in accordance with Section 903.3.1.1, unless otherwise permitted by Sections 903.3.1.2 and 903.3.1.3 and other chapters of this code, as applicable.

903.3.1.1 NFPA 13 sprinkler systems. Where the provisions of this code require that a building or portion thereof be equipped throughout with an automatic sprinkler system in accordance with this section, sprinklers shall be installed throughout in accordance with NFPA 13 *as amended in Chapter 80* except as provided in Sections 903.3.1.1.1 through 903.3.1.1.3.

903.3.1.1.1 Exempt locations. Automatic sprinklers shall not be required in the following rooms or areas where such rooms or areas are protected with an approved automatic fire detection system in accordance with Section 907.2 that will respond to visible or invisible particles of combustion. Sprinklers shall not be omitted from a room merely because it is damp, of fire-resistance-rated construction or contains electrical equipment.

1. A room or space where sprinklers constitute a serious life or fire hazard *as determined by the authority having jurisdiction.*
2. *Machine rooms, machinery spaces, control rooms, control spaces and hoistways associated with f*ire service access elevator*s in accordance with Section 3007.*
3. Machine rooms, machinery spaces, control rooms and control spaces *and hoistways* associated with occupant evacuation elevators designed in accordance with Section 3008 of the *California Building Code*.
4. *Spaces or areas in telecommunications buildings used exclusively for telecommunications equipment, and associated electrical power distribution equipment, provided those spaces or areas are equipped throughout with an automatic smoke detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the California Building Code or not less than 2-hour horizontal assemblies constructed in accordance with Section 712 of the California Building Code, or both.*

903.3.1.1.2 Bathrooms. In Group R occupancies, sprinklers shall not be required in bathrooms that do not exceed 55 square feet (5 m^2) in area and are located within individual dwelling units or sleeping units, provided that walls and ceilings, including the walls and ceilings behind a shower enclosure or tub, are of noncombustible or limited-combustible materials with a 15-minute thermal barrier rating.

903.3.1.1.3 Lithium-Ion or lithium metal batteries. Where automatic sprinkler systems are required by this code for areas containing lithium-ion or lithium metal batteries, the design of the system shall be based on a series of fire tests. Such tests shall be conducted or witnessed and reported by an approved testing laboratory involving test scenarios that address the range of variables associated with the intended arrangement of the hazards to be protected.

903.3.1.1.4 Solar photovoltaic power systems. *Automatic sprinklers shall not be required in the following areas:*

1. *Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath, including storage.*
2. *Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.*

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R *as amended in Chapter 80* where the Group R occupancy meets all of the following conditions:

1. Four stories or less above grade plane.
2. For other than Group R-2 occupancies, the floor level of the highest story is 30 feet (9144 mm) or less above the lowest level of fire department vehicle access.

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For Group R-2 occupancies, the roof assembly is less than 45 feet (13 716 mm) above the lowest level of fire department vehicle access. The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance.

3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the *California Building Code* shall be measured from grade plane.

903.3.1.2.1 Balconies and decks. Sprinkler protection shall be provided for exterior balconies, decks and ground floor patios of dwelling units and sleeping units where either of the following conditions exists:

1. The building is of Type V construction, provided that there is a roof or deck above.
2. Exterior balconies, decks and ground floor patios of dwelling units and sleeping units are constructed in accordance with Section 705.2.3.1, Exception 3 of the *California Building Code*.

Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies and decks that are constructed of open wood joist construction.

903.3.1.2.2 Corridors and balconies in the means of egress. Sprinkler protection shall be provided in corridors and for balconies in the means of egress where any of the following conditions apply:

1. Corridors with combustible floor or walls.
2. Corridors with an interior change of direction exceeding 45 degrees (0.79 rad).
3. Corridors that are less than 50 percent open to the outside atmosphere at the ends.
4. Open-ended corridors and associated exterior stairways and ramps as specified in Section 1027.6, Exception 3.
5. Egress balconies not complying with Sections 1021.2 and 1021.3.

903.3.1.2.3 Attics. Attic protection shall be provided as follows:

1. Attics that are used or intended for living purposes or storage shall be protected by an automatic sprinkler system.
2. Where fuel-fired equipment is installed in an unsprinklered attic, not fewer than one quick-response intermediate temperature sprinkler shall be installed above the equipment.
3. Where located in a building of Type III, Type IV or Type V construction designed in accordance with Section 510.2 or 510.4 of the *California Building Code*, attics not required by Item 1 to have sprinklers shall comply with one of the following if the roof assembly is located more than 55 feet (16 764 mm) above the lowest level of fire department vehicle access needed to meet the provisions in Section 503:
   - 3.1. Provide automatic sprinkler system protection.
   - 3.2. Construct the attic using noncombustible materials.
   - 3.3. Construct the attic using fire-retardant-treated wood complying with Section 2303.2 of the *California Building Code*.
   - 3.4. Fill the attic with noncombustible insulation.

   The height of the roof assembly shall be determined by measuring the distance from the lowest required fire vehicle access road surface adjacent to the building to the eave of the highest pitched roof, the intersection of the highest roof to the exterior wall, or the top of the highest parapet, whichever yields the greatest distance. For the purpose of this measurement, required fire vehicle access roads shall include only those roads that are necessary for compliance with Section 503.

➡ **903.3.1.3 NFPA 13D sprinkler systems.** Automatic sprinkler systems installed in one- and two-family dwellings, Group R-3,
➡ and townhouses shall be permitted to be installed throughout in accordance with NFPA 13D *as amended in Chapter 80.*

903.3.2 Quick-response and residential sprinklers. Where automatic sprinkler systems are required by this code, quick-response or residential automatic sprinklers shall be installed in all of the following areas in accordance with Section 903.3.1 and their listings:

1. Throughout all spaces within a smoke compartment containing care recipient sleeping units in Group I-2 in accordance with the *California Building Code*.

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2. *Reserved.*
3. Throughout all spaces within a *smoke compartment* containing treatment rooms in ambulatory care facilities.
4. Dwelling units and sleeping units in Group I-1 and R occupancies.
5. Light-hazard occupancies as defined in NFPA 13.

903.3.3 Obstructed locations. Automatic sprinklers shall be installed with regard to obstructions that will delay activation or obstruct the water distribution pattern and shall be in accordance with the applicable automatic sprinkler system standard that is being used. Automatic sprinklers shall be installed in or under covered kiosks, displays, booths, concession stands or equipment that exceeds 4 feet (1219 mm) in width. Not less than a 3-foot (914 mm) clearance shall be maintained between automatic sprinklers and the top of piles of combustible fibers.

Exception: Kitchen equipment under exhaust hoods protected with a fire-extinguishing system in accordance with Section 904.

903.3.4 Actuation. Automatic sprinkler systems shall be automatically actuated unless specifically provided for in this code.

903.3.5 Water supplies. Water supplies for automatic sprinkler systems shall comply with this section and the standards referenced in Section 903.3.1. The potable water supply shall be protected against backflow in accordance with *Health and Safety Code 13114.7*. For connections to public waterworks systems, the water supply test used for design of fire protection systems shall be adjusted to account for seasonal and daily pressure fluctuations based on information from the water supply authority and as approved by the fire code official.

903.3.5.1 Domestic services. Where the domestic service provides the water supply for the automatic sprinkler system, the supply shall be in accordance with this section.

903.3.5.2 Residential combination services. A single combination water supply shall be allowed provided that the domestic demand is added to the sprinkler demand as required by NFPA 13R.

903.3.6 Hose threads. Fire hose threads and fittings used in connection with automatic sprinkler systems shall be as prescribed by the fire code official.

903.3.7 Fire department connections. Fire department connections for automatic sprinkler systems shall be installed in accordance with Section 912.

903.3.8 Limited area sprinkler systems. Limited area sprinkler systems shall be in accordance with the standards listed in Section 903.3.1 except as provided in Sections 903.3.8.1 through 903.3.8.5.

903.3.8.1 Number of sprinklers. Limited area sprinkler systems shall not exceed six sprinklers in any single fire area.

903.3.8.2 Occupancy hazard classification. Only areas classified by NFPA 13 as Light Hazard or Ordinary Hazard Group 1 shall be permitted to be protected by limited area sprinkler systems.

903.3.8.3 Piping arrangement. Where a limited area sprinkler system is installed in a building with an automatic wet standpipe system, sprinklers shall be supplied by the standpipe system. Where a limited area sprinkler system is installed in a building without an automatic wet standpipe system, water shall be permitted to be supplied by the plumbing system provided that the plumbing system is capable of simultaneously supplying domestic and sprinkler demands.

903.3.8.4 Supervision. Control valves shall not be installed between the water supply and sprinklers unless the valves are of an approved indicating type that are supervised or secured in the open position.

903.3.8.5 Calculations. Hydraulic calculations in accordance with NFPA 13 shall be provided to demonstrate that the available water flow and pressure are adequate to supply all sprinklers installed in any single fire area with discharge densities corresponding to the hazard classification.

903.3.9 High-rise building floor control valves. Approved supervised indicating control valves shall be provided at the point of connection to the riser on each floor in high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access.*

903.3.10 Floor control valves. *Floor control valves and waterflow detection assemblies shall be installed at each floor where any of the following occur:*

1. *Buildings where the floor level of the highest story is located more than 30 feet above the lowest level of fire department vehicle access.*
2. *Buildings that are four or more stories in height.*
3. *Buildings that are two or more stories below the highest level of fire department vehicle access.*

Exception: *Group R-3 and R-3.1 occupancies floor control valves and waterflow detection assemblies shall not be required.*

903.4 Sprinkler system supervision and alarms. Automatic sprinkler system supervision and alarms shall comply with Sections 903.4.1 through 903.4.3.

903.4.1 Electronic supervision. Valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all automatic sprinkler systems shall be electrically supervised by a listed fire alarm control unit.

Exceptions:

1. Automatic sprinkler systems protecting one- and two-family dwellings.

2. Limited area sprinkler systems in accordance with Section 903.3.8, provided that backflow prevention device test valves located in limited area sprinkler system supply piping shall be locked in the open position unless supplying an occupancy required to be equipped with a fire alarm system, in which case the backflow preventer valves shall be electrically supervised by a tamper switch installed in accordance with NFPA 72 and separately annunciated.
3. Automatic sprinkler systems installed in accordance with NFPA 13R where a common supply main is used to supply both domestic water and the automatic sprinkler system, and a separate shutoff valve for the automatic sprinkler system is not provided.
4. Jockey pump control valves that are sealed or locked in the open position.
5. Control valves to commercial kitchen hoods, paint spray booths or dip tanks that are sealed or locked in the open position.
6. Valves controlling the fuel supply to fire pump engines that are sealed or locked in the open position.
7. Trim valves to pressure switches in dry, preaction and deluge sprinkler systems that are sealed or locked in the open position.
8. Underground key or hub gate valves in roadway boxes.

903.4.2 Monitoring. Alarm, supervisory and trouble signals shall be distinctly different and shall be automatically transmitted to an approved supervising station or, where approved by the fire code official, shall sound an audible signal at a constantly attended location.

➡ **903.4.3 Alarms.** An approved audible and visual sprinkler waterflow alarm device, located on the exterior of the building in an approved location, shall be connected to each automatic sprinkler system. Such sprinkler waterflow alarm devices shall be activated by water flow equivalent to the flow of a single sprinkler of the smallest orifice size installed in the system. Where a waterflow switch is required by Section 903.4.1 to be electrically supervised, such sprinkler waterflow alarm devices shall be powered by a fire alarm control unit or, where provided, a fire alarm system. Where a fire alarm system is provided, actuation of the automatic sprinkler system shall actuate the building fire alarm system.

Exception: Automatic sprinkler systems protecting one- and two-family dwellings.

903.5 Inspection, testing and maintenance. Automatic sprinkler systems shall be inspected, tested and maintained in accordance with Section 901.

903.6 Where required in existing buildings and structures. An automatic sprinkler system shall be provided in existing buildings and structures where required in Chapter 11.

SECTION 904—ALTERNATIVE AUTOMATIC FIRE-EXTINGUISHING SYSTEMS

904.1 General. Automatic fire-extinguishing systems, other than automatic sprinkler systems, shall be designed, installed, inspected, tested and maintained in accordance with the provisions of this section and the applicable referenced standards.

[California Code of Regulations, Title 19, Division 1, §904(a)(2)] Required Inspection, Testing and Maintenance Frequencies.

(2) Engineered and pre-engineered fixed extinguishing systems shall be inspected, tested and maintained at least semi-annually, and immediately after a system activation.

[California Code of Regulations, Title 19, Division 1, §904(c)] Required Inspection, Testing and Maintenance Frequencies.

(c) Engineered and pre-engineered fixed extinguishing systems, regardless of installation date, shall be inspected, tested and maintained within the time periods specified in California Code of Regulations, Title 19, Division 1, Section 904(a)(2) above.

[California Code of Regulations, Title 19, Division 1, §904.7(a) through (c)] Inspection, Testing and Maintenance Requirements for Engineered and Pre-engineered Fixed Extinguishing Systems.

Inspection, Testing and Maintenance shall be performed in accordance with:

(a) California Code of Regulations, Title 19, Division 1, Section 904(a)(2),

(b) the manufacturer's written instructions, which are approved and on file with the Office of the State Fire Marshal; and

(c) the applicable standards adopted in California Code of Regulations, Title 24, Part 9, (California Fire Code).

904.1.1 Certification of service personnel for fire-extinguishing equipment. Service personnel providing or conducting maintenance on automatic fire-extinguishing systems, other than automatic sprinkler systems, shall possess a valid certificate issued by an approved governmental agency, or other approved organization for the type of system and work performed.

904.2 Where permitted. Automatic fire-extinguishing systems installed as an alternative to the required automatic sprinkler systems of Section 903 shall be approved by the fire code official.

904.2.1 Restriction on using automatic sprinkler system exceptions or reductions. Automatic fire-extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed for automatic sprinkler systems or by other requirements of this code.

904.2.2 Commercial hood and duct systems. Each required commercial kitchen exhaust hood and duct system required by Section 606 to have a Type I hood shall be protected with an approved automatic fire-extinguishing system installed in accordance with this code.

904.3 Installation. Automatic fire-extinguishing systems shall be installed in accordance with this section.

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904.3.1 Electrical wiring. Electrical wiring shall be in accordance with *the California Electrical Code.*

904.3.2 Actuation. Automatic fire-extinguishing systems shall be automatically actuated and provided with a manual means of actuation in accordance with Section 904.14.1. Where more than one hazard could be simultaneously involved in fire due to their proximity, all hazards shall be protected by a single system designed to protect all hazards that could become involved.

Exception: Multiple systems shall be permitted to be installed if they are designed to operate simultaneously.

904.3.3 System interlocking. Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard.

904.3.4 Alarms and warning signs. Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with Section 907.5.2.

904.3.5 Monitoring. Where a building fire alarm system is installed, automatic fire-extinguishing systems shall be monitored by the building fire alarm system in accordance with NFPA 72.

904.4 Inspection and testing. Automatic fire-extinguishing systems shall be inspected and tested in accordance with the provisions of this section prior to acceptance.

904.4.1 Inspection. Prior to conducting final acceptance tests, all of the following items shall be inspected:

1. Hazard specification for consistency with design hazard.
2. Type, location and spacing of automatic- and manual-initiating devices.
3. Size, placement and position of nozzles or discharge orifices.
4. Location and identification of audible and visible alarm devices.
5. Identification of devices with proper designations.
6. Operating instructions.

904.4.2 Alarm testing. Notification appliances, connections to fire alarm systems and connections to approved supervising stations shall be tested in accordance with this section and Section 907 to verify proper operation.

904.4.2.1 Audible and visible signals. The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.

904.4.3 Monitor testing. Connections to protected premises and supervising station fire alarm systems shall be tested to verify proper identification and retransmission of alarms from automatic fire-extinguishing systems.

904.5 Wet-chemical systems. Wet-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 17A and their listing. Records of inspections and testing shall be maintained.

904.5.1 System test. Systems shall be inspected and tested for proper operation at six-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

904.5.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

904.6 Dry-chemical systems. Dry-chemical extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 17 and their listing. Records of inspections and testing shall be maintained.

904.6.1 System test. Systems shall be inspected and tested for proper operation at six-month intervals. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing system units shall be weighed, and the required amount of agent verified. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals indicated by the manufacturer.

904.6.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

904.7 Foam systems. Foam-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 11 and their listing. Records of inspections and testing shall be maintained.

904.7.1 System test. Foam-extinguishing systems shall be inspected and tested at intervals in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5.*

904.8 Carbon dioxide systems. Carbon dioxide extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 12 and their listing. Records of inspections and testing shall be maintained.

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904.8.1 System test. Systems shall be inspected and tested for proper operation *in accordance with California Code of Regulations, Title 19, Division 1, Chapter 5.*

904.8.2 High-pressure cylinders. High-pressure cylinders shall be weighed and the date of the last hydrostatic test shall be verified at six-month intervals. Where a container shows a loss in original content of more than 10 percent, the cylinder shall be refilled or replaced.

904.8.3 Low-pressure containers. The liquid-level gauges of low-pressure containers shall be observed at one-week intervals. Where a container shows a content loss of more than 10 percent, the container shall be refilled to maintain the minimum gas requirements.

904.8.4 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.8.4.1 Test procedure. Hoses shall be tested at not less than 2,500 pounds per square inch (psi) (17 238 kPa) for high-pressure systems and at not less than 900 psi (6206 kPa) for low-pressure systems.

904.8.5 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure that such components are in proper operating condition.

904.9 Halon systems. Halogenated extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 12A and their listing. Records of inspections and testing shall be maintained.

904.9.1 System test. Systems shall be inspected and tested for proper operation *in accordance with California Code of Regulations, Title 19, Division 1, Chapter 5.*

904.9.2 Containers. The extinguishing agent quantity and pressure of containers shall be checked at six-month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure (adjusted for temperature) of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.9.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.9.3.1 Test procedure. For Halon 1301 systems, hoses shall be tested at not less than 1,500 psi (10 343 kPa) for 600 psi (4137 kPa) charging pressure systems and not less than 900 psi (6206 kPa) for 360 psi (2482 kPa) charging pressure systems. For Halon 1211 hand-hose line systems, hoses shall be tested at 2,500 psi (17 238 kPa) for high-pressure systems and 900 psi (6206 kPa) for low-pressure systems.

904.9.4 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure such components are in proper operating condition.

904.10 Clean-agent systems. Clean-agent fire-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 2001 and their listing. Records of inspections and testing shall be maintained.

904.10.1 System test. Systems shall be inspected and tested for proper operation *in accordance with California Code of Regulations, Title 19, Division 1, Chapter 5.*

904.10.2 Containers. The extinguishing agent quantity and pressure of the containers shall be checked at six-month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure, adjusted for temperature, of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.10.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. All hoses shall be tested at 5-year intervals.

904.11 Automatic water mist systems. Automatic water mist systems shall be permitted in applications that are consistent with the applicable listing or approvals and shall comply with Sections 904.11.1 through 904.11.3.

904.11.1 Design and installation requirements. Automatic water mist systems shall be designed and installed in accordance with Sections 904.11.1.1 through 904.11.1.4.

904.11.1.1 General. Automatic water mist systems shall be designed and installed in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* NFPA 750 and the manufacturer's instructions.

904.11.1.2 Actuation. Automatic water mist systems shall be automatically actuated.

904.11.1.3 Water supply protection. Connections to a potable water supply shall be protected against backflow in accordance with the *California Plumbing Code*.

904.11.1.4 Secondary water supply. Where a secondary water supply is required for an automatic sprinkler system, an automatic water mist system shall be provided with an approved secondary water supply.

904.11.2 Water mist system supervision and alarms. Supervision and alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.1.

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904.11.2.1 Monitoring. Monitoring shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.2.

904.11.2.2 Alarms. Alarms shall be provided as required for automatic sprinkler systems in accordance with Section 903.4.3.

904.11.2.3 Floor control valves. Floor control valves shall be provided as required for automatic sprinkler systems in accordance with Section 903.3.9.

904.11.3 Testing and maintenance. Automatic water mist systems shall be tested and maintained in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5.*

904.12 Hybrid fire-extinguishing systems. Hybrid fire-extinguishing systems shall be designed, installed, maintained, periodically inspected and tested in accordance with NFPA 770. Records of inspection and testing shall be maintained.

904.13 Aerosol fire-extinguishing systems. Aerosol fire-extinguishing systems shall be installed, maintained, periodically inspected and tested in accordance with NFPA 2010 and their listing.

Such devices and appurtenances shall be listed and installed in compliance with manufacturer's instructions.

904.13.1 Maintenance. Not less than semiannually, an inspection shall be conducted by a trained person to assess whether the system is in working order. Not less than annually, a certified fire suppression contractor having knowledge of and training in the installation, operation and maintenance of the specific fire-extinguishing system shall inspect, test, service and maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals. Records of inspections and testing shall be maintained.

904.14 Commercial cooking systems. *Commercial cooking equipment that produce grease laden vapors shall be provided with a Type I Hood, in accordance with the California Mechanical Code, and an automatic fire extinguishing system that is listed and labeled for its intended use as follows:*

1. Wet chemical extinguishing system, complying with UL 300.

2. Carbon dioxide extinguishing systems.

3. Automatic fire sprinkler systems.

All existing dry chemical and wet chemical extinguishing systems shall comply with UL 300.

***Exception:** Public school kitchens, without deep-fat fryers, shall be upgraded to a UL 300 compliant system during state-funded modernization projects that are under the jurisdiction of the Division of the State Architect.*

All systems shall be installed in accordance with the California Mechanical Code, appropriate adopted standards, their listing and the manufacturers' installation instructions.

Exception: Factory-built commercial cooking recirculating systems that are tested in accordance with UL 710B and listed, labeled and installed in accordance with Section 304.1 of the *California Mechanical Code*.

904.14.1 Manual system operation. A manual actuation device shall be located at or near a means of egress from the cooking area not less than 10 feet (3048 mm) and not more than 20 feet (6096 mm) from the kitchen exhaust system. The manual actuation device shall be installed not more than 48 inches (1200 mm) nor less than 42 inches (1067 mm) above the floor and shall clearly identify the hazard protected. The manual actuation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to actuate the fire suppression system.

Exceptions:

1. Automatic sprinkler systems shall not be required to be equipped with manual actuation means.
2. Where locating the manual actuation device between 10 feet (3048 mm) and 20 feet (6096 mm) from the cooking area is not feasible, the fire code official is permitted to accept a location at or near a means of egress from the cooking area, where the manual actuation device is unobstructed and in view from the means of egress.

904.14.2 System interconnection. The actuation of the fire-extinguishing system shall automatically shut down the fuel or electrical power supply to the cooking equipment. The fuel and electrical supply reset shall be manual.

904.14.3 Carbon dioxide systems. Where carbon dioxide systems are used, there shall be a nozzle at the top of the ventilating duct. Additional nozzles that are symmetrically arranged to give uniform distribution shall be installed within vertical ducts exceeding 20 feet (6096 mm) and horizontal ducts exceeding 50 feet (15 240 mm). Dampers shall be installed at either the top or the bottom of the duct and shall be arranged to operate automatically upon activation of the fire-extinguishing system. Where the damper is installed at the top of the duct, the top nozzle shall be immediately below the damper. Automatic carbon dioxide fire-extinguishing systems shall be sufficiently sized to protect all hazards venting through a common duct simultaneously.

904.14.3.1 Ventilation system. Commercial-type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.

904.14.4 Special provisions for automatic sprinkler systems. Automatic sprinkler systems protecting commercial-type cooking equipment shall be supplied from a separate, indicating-type control valve that is identified. Access to the control valve shall be provided.

904.14.4.1 Listed sprinklers. Sprinklers used for the protection of fryers shall be tested in accordance with UL 199E, listed for that application and installed in accordance with their listing.

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904.14.5 Operations and maintenance. Automatic fire-extinguishing systems protecting commercial cooking systems shall be maintained in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5 and* Sections 904.14.5.1 through 904.14.5.3.

904.14.5.1 Existing automatic fire-extinguishing systems. Where changes in the cooking media, positioning of cooking equipment or replacement of cooking equipment occur in existing commercial cooking systems, the automatic fire-extinguishing system shall be required to comply with the applicable provisions of Sections 904.14 through 904.14.4.

904.14.5.2 Extinguishing system service. Automatic fire-extinguishing systems shall be serviced not less frequently than every six months and after activation of the system. Inspection shall be by qualified individuals, and a certificate of inspection shall be forwarded to the fire code official upon completion.

904.14.5.3 Fusible link and sprinkler head replacement. Fusible links and automatic sprinkler heads shall be replaced annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

Exception: Frangible bulbs are not required to be replaced annually.

904.15 Domestic cooking facilities. Cooktops and ranges installed in the following occupancies shall be protected in accordance with Section 904.15.1:

1. In Group *R-2.-1* occupancies where domestic cooking facilities are installed in accordance with Section 420.9 of the *California Building Code*.
2. In Group I-2 occupancies where domestic cooking facilities are installed in accordance with Section 407.2.7 of the *California Building Code*.
3. In Group R-2 college dormitories where domestic cooking facilities are installed in accordance with Section 420.11 of the *California Building Code*.

904.15.1 Protection from fire. Cooktops and ranges shall be protected in accordance with Section 904.15.1.1 or 904.15.1.2.

904.15.1.1 Automatic fire-extinguishing system. The domestic recirculating or exterior vented cooking hood provided over the cooktop or range shall be equipped with an approved automatic fire-extinguishing system complying with the following:

1. The automatic fire-extinguishing system shall be of a type recognized for protection of domestic cooking equipment. Preengineered automatic fire-extinguishing systems shall be listed and labeled in accordance with UL 300A and installed in accordance with the manufacturer's instructions.
2. Manual actuation of the fire-extinguishing system shall be provided in accordance with Section 904.14.1.
3. Interconnection of the fuel and electric power supply shall be in accordance with Section 904.14.2.

904.15.1.2 Ignition prevention. Cooktops and ranges shall include burners that have been tested and listed to prevent ignition of cooking oil with burners turned on to their maximum heat settings and allowed to operate for 30 minutes.

SECTION 905—STANDPIPE SYSTEMS

905.1 General. Standpipe systems shall be provided in new buildings and structures in accordance with Sections 905.2 through 905.*10*. In buildings used for high-piled combustible storage, fire protection shall be in accordance with Chapter 32.

905.2 Installation standard. Standpipe systems shall be installed in accordance with this section and NFPA 14 *as amended in Chapter 80*. Fire department connections for standpipe systems shall be in accordance with Section 912.

905.3 Required installations. Standpipe systems shall be installed where required by Sections 905.3.1 through *905.3.10* Standpipe systems are allowed to be combined with automatic sprinkler systems.

Exceptions:

1. Standpipe systems are not required in Group R-2 townhouses.
2. Standpipe systems are not required in Group R-3 occupancies.

905.3.1 Height. *In other than Group R-3 and R-3.1 occupancies,* Class III standpipe systems shall be installed throughout *at each floor where any of the following occur:*

1. *Buildings where* the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access.
2. *Buildings that are four or more stories in height.*
3. *Buildings where* the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access.
4. *Buildings that are two or more stories below the highest level of fire department vehicle access.*

Exceptions:

1. Class I standpipes are allowed in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
2. Class I standpipes are allowed in Group B and E occupancies.
3. Class I standpipes are allowed in parking garages.
4. Class I standpipes are allowed in basements equipped throughout with an automatic sprinkler system.

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5. Class I standpipes are allowed in buildings where occupant-use hose lines will not be utilized by trained personnel or the fire department.
6. In determining the lowest level of fire department vehicle access, it shall not be required to consider either of the following:
    6.1. Recessed loading docks for four vehicles or less.
    6.2. Conditions where topography makes access from the fire department vehicle to the building impractical or impossible.

905.3.2 Group A. Class I automatic wet standpipes shall be provided in nonsprinklered Group A buildings having an occupant load exceeding 1,000 persons.

Exceptions:

1. Open-air-seating spaces without enclosed spaces.
2. Class I automatic dry and semiautomatic dry standpipes or manual wet standpipes are allowed in buildings that are not high-rise buildings.

905.3.3 Covered and open mall buildings. Covered mall and open mall buildings shall be equipped throughout with a standpipe system where required by Section 905.3.1. Mall buildings not required to be equipped with a standpipe system by Section 905.3.1 shall be equipped with Class I hose connections connected to the automatic sprinkler system sized to deliver water at 250 gallons per minute (946.4 L/min) at the hydraulically most remote hose connection while concurrently supplying the automatic sprinkler system demand. The standpipe system shall be designed not to exceed a 50 pounds per square inch (psi) (345 kPa) residual pressure loss with a flow of 250 gallons per minute (946.4 L/min) from the fire department connection to the hydraulically most remote hose connection. Hose connections shall be provided at each of the following locations:

1. Within the mall at the entrance to each exit passageway or corridor.
2. At each floor-level landing within interior exit stairways opening directly on the mall.
3. At exterior public entrances to the mall of a covered mall building.
4. At public entrances at the perimeter line of an open mall building.
5. At other locations as necessary so that the distance to reach all portions of a tenant space does not exceed 200 feet (60 960 mm) from a hose connection.

905.3.4 Underground buildings. Underground buildings shall be equipped throughout with a Class I automatic wet or manual wet standpipe system.

905.3.5 Helistops and heliports. Buildings with a rooftop helistop or heliport shall be equipped with a Class I or III standpipe system extended to the roof level on which the helistop or heliport is located in accordance with Section 2007.5.

905.3.6 Marinas and boatyards. Standpipes in marinas and boatyards shall comply with Chapter 36.

905.3.7 Vegetative roofs and landscaped roofs. Buildings or structures that have landscaped roofs or vegetative roofs and that are equipped with a standpipe system shall have the standpipe system extended to the roof level on which the landscaped roof or vegetative roof is located.

905.3.8 Fixed guideway and passenger rail transit systems. *Fixed-guideway and passenger rail transit systems shall be provided with a Class I standpipe system in accordance with this section.*

905.3.8.1 Underground stations. *Underground stations shall be provided with an automatic Class I standpipe system.*

905.3.8.2 All other stations. *All other stations shall be provided with a Class I standpipe system.*

Exception: *Open at-grade stations with unrestricted fire department access need not be provided with a standpipe system.*

905.3.9 Smokeproof enclosures. *For smokeproof enclosures, see California Building Code, Section 909.20.*

905.3.10 Group I-3. *A housing pod within housing units where 50 or more inmates are restrained shall be provided with Class I wet standpipes. In addition, Class I wet standpipes shall be located so that it will not be necessary to extend hose lines through interlocking security doors and any doors in smoke-barrier walls, horizontal fire walls or fire barrier walls. Standpipes located in housing units may be placed in secured pipe chases.*

905.4 Location of Class I standpipe hose connections. Class I standpipe hose connections shall be provided in all of the following locations:

1. In every required interior exit stairway or exterior exit stairway, a hose connection shall be provided for each story above and below grade plane. Hose connections shall be located at the main floor landing unless otherwise approved by the fire code official. *See Section 909.20.2.3 of the California Building Code for additional provisions in smokeproof enclosures.*

    Exception: A single hose connection shall be permitted to be installed in the open corridor or open breezeway between open stairs that are not greater than 75 feet (22 860 mm) apart.
2. On each side of the wall adjacent to the exit opening of a horizontal exit.

    Exception: Where floor areas adjacent to a horizontal exit are reachable from an interior exit stairway or exterior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose as measured along the path of travel, a hose connection shall not be required at the horizontal exit.

3. In every exit passageway, at the entrance from the exit passageway to other areas of a building.

   Exception: Where floor areas adjacent to an exit passageway are reachable from an interior exit stairway or exterior exit stairway hose connection by a 30-foot (9144 mm) hose stream from a nozzle attached to 100 feet (30 480 mm) of hose, a hose connection shall not be required at the entrance from the exit passageway to other areas of the building.

4. In covered mall buildings, adjacent to each exterior public entrance to the mall and adjacent to each entrance from an exit passageway or exit corridor to the mall. In open mall buildings, adjacent to each public entrance to the mall at the perimeter line and adjacent to each entrance from an exit passageway or exit corridor to the mall.

5. Where the roof has a slope less than 4 units vertical in 12 units horizontal (33.3-percent slope), a hose connection shall be located to serve the roof or at the highest landing of an interior exit stairway with access to the roof provided in accordance with Section 1011.12.

6. Where the most remote portion of a floor or story is more than 150 feet (45 720 mm) from a hose connection, the fire code official is authorized to require that additional hose connections be provided in approved locations. *The distances from a hose connection shall be measured along the path of travel.*

905.4.1 Protection. Risers and laterals of Class I standpipe systems not located within an interior exit stairway shall be protected by a degree of fire resistance equal to that required for vertical enclosures in the building in which they are located.

Exception: In buildings equipped throughout with an approved automatic sprinkler system, laterals that are not located within an interior exit stairway are not required to be enclosed within fire-resistance-rated construction.

905.4.2 Interconnection. In buildings where more than one standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

905.5 Location of Class II standpipe hose connections. Class II standpipe hose connections shall be located so that all portions of the building are within 30 feet (9144 mm) of a *listed variable stream fog* nozzle attached to 100 feet (30 480 mm) of hose. Class II standpipe hose connections shall be located where they will have ready access.

905.5.1 Groups A-1 and A-2. In Group A-1 and A-2 occupancies with occupant loads of more than 1,000, hose connections shall be located on each side of the rear of the auditorium and on each side of the balcony.

905.5.2 Protection. Fire-resistance-rated protection of risers and laterals of Class II standpipe systems is not required.

905.5.3 Class II system 1-inch hose. A minimum 1-inch (25 mm) hose shall be allowed to be used for hose stations in light-hazard occupancies where investigated and listed for this service and where approved by the fire code official.

905.6 Location of Class III standpipe hose connections. Class III standpipe systems shall have hose connections located as required for Class I standpipes in Section 905.4 and shall have Class II hose connections as required in Section 905.5.

905.6.1 Protection. Risers and laterals of Class III standpipe systems shall be protected as required for Class I systems in accordance with Section 905.4.1.

905.6.2 Interconnection. In buildings where more than one Class III standpipe is provided, the standpipes shall be interconnected in accordance with NFPA 14.

905.7 Cabinets. Cabinets containing firefighting equipment, such as standpipes, fire hose, fire extinguishers or fire department valves, shall not be blocked from use or obscured from view.

905.7.1 Cabinet equipment identification. Cabinets shall be identified in an approved manner by a permanently attached sign with letters not less than 2 inches (51 mm) high in a color that contrasts with the background color, indicating the equipment contained therein.

Exceptions:

1. Doors not large enough to accommodate a written sign shall be marked with a permanently attached pictogram of the equipment contained therein.
2. Doors that have either an approved visual identification clear glass panel or a complete glass door panel are not required to be marked.

905.7.2 Locking cabinet doors. Cabinets shall be unlocked.

Exceptions:

1. Visual identification panels of glass or other approved transparent frangible material that is easily broken and allows access.
2. Approved locking arrangements.
3. Group I-3 occupancies *and in mental health areas of Group I-2 occupancies.*

905.8 Dry standpipes. Dry standpipes shall not be installed.

Exception: Where subject to freezing and in accordance with NFPA 14.

905.9 Valve supervision. Valves controlling water supplies shall be supervised in the open position so that a change in the normal position of the valve will generate a supervisory signal at the supervising station required by Section 903.4.1. Where a fire alarm system is provided, a signal shall be transmitted to the control unit.

Exceptions:

1. Valves to underground key or hub valves in roadway boxes do not require supervision.

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2. Valves locked in the normal position and inspected as provided in this code in buildings not equipped with a fire alarm system.

905.10 During construction. Standpipe systems required during construction and demolition operations shall be provided in accordance with Section 3307.

905.11 Locking standpipe outlet caps. The fire code official is authorized to require locking caps on the outlets on standpipes where the responding fire department carries key wrenches for the removal that are compatible with locking FDC connection caps.

905.12 Existing buildings. Where required in Chapter 11, existing structures shall be equipped with standpipes installed in accordance with Section 905.

SECTION 906—PORTABLE FIRE EXTINGUISHERS

906.1 Where required. Portable fire extinguishers shall be installed in all of the following locations:

1. In new and existing Group A, B, E, F, H, I, *L,* M, R-1, R-2, *R-2.1, R-2.2, R-3.1,* R-4 and S occupancies.

   Exception: In Group R-2 occupancies, portable fire extinguishers shall be required only in locations specified in Items 2 through 6 where each dwelling unit is provided with a portable fire extinguisher having a minimum rating of 1-A:10-B:C.
2. Within 30 feet (9144 mm) distance of travel from commercial cooking equipment and from domestic cooking equipment in Group I-2 and R-2 college dormitory occupancies.
3. In areas where flammable or combustible liquids are stored, used or dispensed.
4. On each floor of structures under construction, except Group R-3 occupancies, in accordance with Section 3306.6.
5. Where required by the sections indicated in Table 906.1.
6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the fire code official.
7. *Large and small family day-care homes shall be equipped with a portable fire extinguisher having a minimum 2-A:10-B:C rating.*
8. *Where required by California Code of Regulations, Title 19, Division 1.*
9. *Within 30 feet (9144 mm) of domestic cooking equipment located in a Group I-2.*

[California Code of Regulations, Title 19, Division 1, §3.29(a) through (d)] Portable Fire Extinguishing Equipment.

(a) General. Portable fire extinguishers conforming to the requirements of California Code of Regulations, Title 19, Division 1, Chapter 3, shall be installed and maintained in accordance with guides established therein.

(b) Special Coverage. Additional Class A, B and C units of adequate extinguishing potential shall be provided for any other hazard, as determined by the enforcing agency.

(c) Group A Occupancies.

(1) One additional Class 2-A unit shall be provided in Group A Occupancies as follows:

(A) On each side of the stage or platform.

***Exception:** Platforms 1000 square feet or less in area need have only one such extinguishing unit.*

(B) On each side of every fly gallery.

(C) In basements beneath the stage or platform.

(D) In every hallway or passageway leading to a dressing room.

(E) In every property room, carpenter shop or similar workroom.

(2) Not less than one 10-B:C unit (not less than 4-B:C for existing extinguishers in existing occupancies) shall be provided:

(A) For each motor and fan room.

(B) Adjacent to each switchboard on the stage or platform.

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(C) For each motion picture machine in projection rooms.

Exception: *One 20-B:C unit (not less than 8-B:C for existing extinguishers in existing occupancies) in each projection room may be accepted as providing substantially equal protection.*

(3) The enforcing agency may allow modifications or deviations relative to the number and location of portable fire extinguishers as required by this section provided such authority finds that the basic intent of this section and the ease of accessibility to extinguishers is otherwise achieved.

(d) Group R-2.1, R-3.1 and R-4 Occupancies. In Group R-2.1, R-3.1 and R-4 occupancies, a continuously attached garden hose, equipped with a water flow control nozzle, may be provided in lieu of one or more required fire extinguishers when acceptable to the enforcing agency. The location and length of such hose shall be as designated or approved by the enforcing agency.

NOTE: *It is recommended that, wherever possible, portable fire extinguishers be located adjacent to manual fire alarm sending stations.*

[California Code of Regulations, Title 19, Division 1, §565(a)] Selection of Fire Extinguishers.

(a) The selection of extinguishers for a given situation shall be determined by the authority having jurisdiction in accordance with adopted codes or ordinances. The character of the fires anticipated, the construction and occupancy of the individual property, the vehicle or hazard to be protected, ambient-temperature conditions and other factors shall be considered. The number, size, placement and limitations of use of extinguishers required shall be determined by using California Code of Regulations, Title 19, Division 1, Sections 567 through 573.

Exception: Portable fire extinguishers are not required at normally unmanned Group U occupancy buildings or structures where a portable fire extinguisher suitable to the hazard of the location is provided on the vehicle of visiting personnel.

TABLE 906.1—ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

SECTION	SUBJECT
303.5	Asphalt kettles
307.5	Open burning
308.1.3	Open flames—torches
309.4	Powered industrial trucks
1204.10	Portable generators
2005.2	Aircraft towing vehicles
2005.3	Aircraft welding apparatus
2005.4	Aircraft fuel-servicing tank vehicles
2005.5	Aircraft hydrant fuel-servicing vehicles
2005.6	Aircraft fuel-dispensing stations
2007.7	Heliports and helistops
2108.4	Dry cleaning plants
2305.5	Motor fuel-dispensing facilities
2310.6.4	Marine motor fuel-dispensing facilities
2311.6	Repair garages
2404.6.1	Spray-finishing operations
2405.4.2	Dip-tank operations
2406.4.2	Powder-coating areas
2804.3	Lumberyards/woodworking facilities
2808.8	Recycling facilities
2809.5	Exterior lumber storage
2903.5	Organic-coating areas
3006.3	Industrial ovens
3108.9	Tents and membrane structures
3206.10	High-piled storage
3306.6	Buildings under construction or demolition
3305.10.2	Roofing operations
3408.2	Tire rebuilding/storage
3504.2.6	Welding and other hot work
3604.4	Marinas
3703.6	Combustible fibers

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TABLE 906.1—ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS—continued	
SECTION	**SUBJECT**
5703.2.1	Flammable and combustible liquids, general
5704.3.3.1	Indoor storage of flammable and combustible liquids
5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
5705.4.9	Solvent distillation units
5706.2.7	Farms and construction sites—flammable and combustible liquids storage
5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
5706.5.4.5	Commercial, industrial, governmental or manufacturing establishments—fuel dispensing
5706.6.4	Tank vehicles for flammable and combustible liquids
5707.5.4	On-demand mobile fueling
5906.5.7	Flammable solids
6108.2	LP-gas

906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and *California Code of Regulations, Title 19, Division 1, Chapter 3.*

Exceptions:

1. The distance of travel to reach an extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.
2. Thirty-day inspections shall not be required *for* portable fire extinguishers that are supervised by a listed and approved electronic monitoring device, provided that all of the following conditions are met:
   - 2.1. Electronic monitoring shall confirm that extinguishers are properly positioned, properly charged and unobstructed.
   - 2.2. Loss of power or circuit continuity to the electronic monitoring device shall initiate a trouble signal.
   - 2.3. The extinguishers shall be installed inside of a building or cabinet in a noncorrosive environment.
   - 2.4. Electronic monitoring devices and supervisory circuits shall be tested every 3 years when extinguisher maintenance is performed.
   - 2.5. A written log of required hydrostatic test dates for extinguishers shall be maintained by the owner to verify that hydrostatic tests are conducted at the frequency required by *California Code of Regulations, Title 19, Division 1, Chapter 3.*
3. In Group I-3, *and in mental health areas of Group I-2,* portable fire extinguishers shall be permitted to be located at staff locations.

[California Code of Regulations, Title 19, Division 1, §565.1(a) through (c)] Classification of Hazards.

(a) Light (Low) Hazard. Locations where the total amounts of Class A combustible materials, including furnishings, decorations and contents, is of minor quantity. These shall include buildings or rooms occupied as offices, classrooms, churches, assembly halls, etc. This classification anticipates that the majority of the contents are either noncombustible or so arranged that a fire is not likely to spread rapidly. Small amounts of Class B flammables used for duplicating machines, art departments, etc., are included provided that they are kept in closed containers and safely stored.

(b) Ordinary (Moderate) Hazard. Locations where the total amounts of Class A combustibles and Class B flammables are present in greater amounts than expected under Light (Low) Hazard occupancies. These occupancies could consist of offices, classrooms, mercantile shops and allied storage, light manufacturing, research operations, auto showrooms, parking garages, workshop or support service areas of Light (Low) Hazard occupancies, and warehouses containing Class I or Class II commodities.

(c) Extra (High) Hazard. Locations where the total amount of Class A combustibles and Class B flammables are present, in storage, production use, and/or finished product over and above those expected and classed as Ordinary (Moderate) Hazards. These occupancies could consist of woodworking, vehicle repair, aircraft and boat servicing, individual product display showrooms, product convention center displays, storage and manufacturing processes such as painting, dipping, coating, including flammable liquid handling. Also, included in warehousing of, or in-process storage of other Class I and Class II commodities.

[California Code of Regulations, Title 19, Division 1, §565.2(a) through (e)] Selection by Hazard.

(a) Extinguishers shall be selected for the specific class or classes of hazards to be protected in accordance with the following subdivisions (b), (c), (d) and (e).

(b) Extinguishers for protecting Class A hazards shall be selected from the following: Water-type, halogenated agent types, multipurpose dry chemical and wet chemical type.

(c) Extinguishers for protection of Class B hazards shall be selected from the following: carbon dioxide, dry chemical types, halogenated agent types and water-type and water chemical extinguishers rated for Class B hazards.

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(d) Extinguishers for protection of Class C hazards shall be selected from the following: carbon dioxide, dry chemical types, halogenated agent types and water mist types rated for Class C. Carbon dioxide extinguishers equipped with metal horns are not considered safe for use on fires in energized electrical equipment and, therefore, are not classified for use on Class C hazards.

(e) Extinguishers and extinguishing agents for the protection of Class D hazards shall be of types approved for use on the specific combustible metal hazard.

[California Code of Regulations, Title 19, Division 1, §566(a) through (f)] Application for Specific Hazards.

(a) Class B Fire Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires. Fires of this nature are considered to be a special hazard. Class B fire extinguishers containing agents other than dry chemical are relatively ineffective on this type of hazard due to stream and agent characteristics. Selection of extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment. The system used to rate extinguishers on Class B fires (flammable liquids in depth) is not applicable to these types of hazards. It has been determined that special nozzle design and rates of agent application are required to cope with such hazards. Caution: It is undesirable to attempt to extinguish this type of fire unless there is reasonable assurance that the source of fuel can be promptly shut off.

(b) Fire extinguishers provided for the protection of cooking appliances that use combustible cooking media (vegetable or animal oils and fats) shall be listed and labeled Class K fires.

(c) Three-dimensional Class B Fires. A three-dimensional Class B fire involves Class B materials in motion such as pouring, running or dripping flammable liquids and generally includes vertical as well as one or more horizontal surfaces. Fires of this nature are considered to be a special hazard. Selection of extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment. The system used to rate extinguishers on Class B fires (flammable liquids in depth) is not directly applicable to this type of hazard.

(d) Water Soluble Flammable Liquid Fires (Polar Solvents). Extinguishers used for the protection of water soluble flammable liquids, such as alcohols, acetones, esters, ketones, etc., shall be selected in accordance with Section 565.2. AFFF-type and FFFP-type fire extinguishers shall not be used for the protection of water soluble flammable liquids, such as alcohols, acetone, esters, ketones, etc., unless specifically referenced on the extinguisher nameplate.

(e) Electronic Equipment Fires. Extinguishers for the protection of delicate electronic equipment shall be selected from the following: carbon dioxide type or a halogenated agent type, or a distilled water mist type with a minimum Class A:C Rating.

(f) In patient care areas and sleeping rooms of health care facilities, fire extinguishers, including the agents and expelling means, should be selected and utilized that would not be detrimental to patients and are appropriate for the type of fire expected, such as distilled water mist type fire extinguishers with a minimum 2-A:C rating.

[California Code of Regulations, Title 19, Division 1, §567.8] Installation Temperatures.

Water-type (water, AFFF, FFFP) extinguishers shall not be installed in areas where temperatures are outside the range of 40°F to 120°F (4°C to 49°C). Other types shall not be installed in areas where temperatures are outside the range of -40°F to 120°F (-40°C to 49°C). Fire extinguishers shall not be exposed to temperatures outside of the range shown on the fire extinguisher label.

Exceptions:

1. *Where fire extinguishers are installed in locations subject to temperatures outside these ranges, they shall be of a type approved and listed for the temperature to which they are exposed, or they shall be placed in an enclosure capable of maintaining the stipulated temperature range.*
2. *Fire extinguishers containing plain water only can be protected to temperatures as low as -40°F (-40°C) by the addition of an antifreeze stipulated on the extinguisher nameplate. Calcium chloride solutions shall not be used in stainless steel fire extinguishers.*
3. *Some fire extinguishers are approved or listed for use at temperatures as low as -65°F (-54°C).*

[California Code of Regulations, Title 19, Division 1, §574.1] Frequency of Inspection.

Fire extinguishers shall be manually inspected when initially placed in service. Thereafter, extinguishers shall be manually inspected at least monthly by the building owner, occupant or his/her authorized agent, or electronically monitored. Fire extinguishers shall be inspected at more frequent intervals when circumstances require, as determined by the Authority Having Jurisdiction.

[California Code of Regulations, Title 19, Division 1, §574.2] Inspection Procedures.

(a) In addition to California Code of Regulations, Title 19, Division 1, Section 574.1, fire extinguishers shall be manually inspected in accordance with this section if they are located where any of the following conditions exist:

(1) High frequency of fires in the past.

(2) Extra (high) hazard areas.

(3) Location that makes fire extinguishers susceptible to mechanical or physical damage.

(4) Exposure to abnormal temperatures or corrosive atmospheres.

(b) Manual inspection of extinguishers shall include a check of at least the following items:

(1) Located in designated place.

(2) No obstruction to access or visibility.

(3) Operating instructions on nameplate legible and facing outward.

(4) Safety seals and tamper indicators not broken or missing.

(5) Examine for obvious physical damage, corrosion, leakage or clogged nozzle.

(6) Pressure gauge reading or indicator in the operable range or position.

(7) Fullness determined by weighing or hefting.

(8) For wheeled units, the condition of tires, wheels, carriage, hose and nozzle shall also be checked.

(9) For nonrechargeable extinguishers using push-to-test pressure indicators, test the indicator.

(c) Electronic monitoring shall include monitoring of the following items:

(1) Located in the designated place.

(2) No obstruction to access or visibility.

(3) Pressure gauge reading or indicator in the operable range or position.

[California Code of Regulations, Title 19, Division 1, §567.1] Operating Conditions.

Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.

[California Code of Regulations, Title 19, Division 1, §574.3] Corrective Action.

When an inspection of any extinguisher reveals a deficiency in any of the conditions listed in Title 19, Division 1, Sections 574.2(b)(c), immediate corrective action shall be taken.

[California Code of Regulations, Title 19, Division 1, §574.4] Nonrechargeable Extinguishers.

When an inspection of any nonrechargeable fire extinguisher reveals a deficiency in any of the conditions listed in (3), (4), (5), (6), (7) or (9) of Title 19, Division 1, Section 574.2(b), it shall be discharged and removed from service.

***Exception:** Nonrechargeable extinguishers containing a halon agent shall be removed from service, not discharged, and returned to the manufacturer or local fire extinguisher distributor having the capability of recovering the halon agent.*

[California Code of Regulations, Title 19, Division 1, §575.10] Out of Service.

Fire extinguishers removed from service for maintenance or recharge shall be replaced by fire extinguishers suitable for the type of hazard protected and shall be of at least equal rating.

[California Code of Regulations, Title 19, Division 1, §591.5] Replacement Extinguishers.

Portable fire extinguishers shall not be removed from the premises for hydrostatic testing or any other purpose, without first replacing the extinguisher with a unit rated for the hazard being protected. The customer's original unit shall be returned within 60 calendar days.

[California Code of Regulations, Title 19, Division 1, §596.7(a) and (b)] Removal of Tag.

(a) No person shall remove any tag, collar or label required by Title 19, Division 1, Chapter 3, Article 9 from a portable fire extinguisher except when service is performed.

(b) No person shall deface, modify or alter any tag collar or label required by California Code of Regulations, Title 19, Division 1, Chapter 3, Article 9 to be attached to any portable fire extinguisher.

[California Code of Regulations, Title 19, Division 1, §574.5(a) through (c)] Inspection Record Keeping.

(a) The fire extinguisher owner shall maintain records of all fire extinguishers inspected, including those extinguishers that were found to require corrective actions. Records shall be maintained until next required maintenance.

(b) At least monthly, the date the manual inspection was performed and the initials of the person performing the inspection shall be recorded on a tag or label attached to the fire extinguisher, or an inspection checklist maintained on file, or an electronic system (e.g., bar coding) that provides a permanent record.

(c) Fire extinguishers being inspected via electronic monitoring, whereby the extinguisher causes a signal at a control unit when a deficiency in any of the conditions listed in California Code of Regulations, Title 19, Division 1, Section 574.2(c) occurs, shall provide record keeping in the form of an electronic event log at the control panel.

906.2.1 Certification of service personnel for portable fire extinguishers. Service personnel providing or conducting maintenance on portable fire extinguishers shall possess a valid certificate *in accordance with California Code of Regulations, Title 19, Division 1, Chapter 3.*

906.3 Size and distribution. The size and distribution of portable fire extinguishers shall be in accordance with Sections 906.3.1 through 906.3.4.

[California Code of Regulations, Title 19, Division 1, §567(a) through (k)] Distribution of Fire Extinguishers.

(a) The minimum number of fire extinguishers needed to protect a property shall be determined as outlined in this section. Additional extinguishers may be installed to provide more suitable protection.

(b) Fire extinguishers shall be provided for the protection of both the building structure and the occupancy hazards contained therein.

(c) Required building protection shall be provided by fire extinguishers suitable for Class A fires.

(d) Occupancy hazard protection shall be provided by fire extinguishers suitable for such Class A, B, C, D or K fire potentials as may be present.

(e) Extinguishers provided for building protection may be considered also for the protection of occupancies having a Class A fire potential.

(f) Buildings having an occupancy hazard subject to Class B and/or Class C fires shall have a standard complement of Class A fire extinguishers for building protection, plus additional Class B and/or Class C extinguishers. Where fire extinguishers have more than one letter classification (such as 2-A:20-B:C), they may be considered to satisfy the requirements of each letter class. When using multi-purpose extinguishers for the protection of Class B hazards, the maximum travel distances described in California Code of Regulations, Title 19, Division 1, Section 568, Table 2 must be observed.

(g) Rooms or areas shall be classified generally as light (low) hazard, ordinary (moderate) hazard or extra (high) hazard. Limited areas of greater or lesser hazard shall be protected as required.

(h) On each floor level, the area protected and the travel distances shall be based on fire extinguishers installed in accordance with California Code of Regulations, Title 19, Division 1, Section 568, Tables 2 and 3.

(i) Fire extinguishers shall not be obstructed or obscured from view.

***Exception:** In large rooms, and in certain locations where visual obstruction cannot be completely avoided, means shall be proved to indicate the fire extinguisher's location.*

(j) Fire extinguishers shall be conspicuously located along normal paths of travel where they will be readily accessible and immediately available in the event of a fire.

(k) Where wheeled extinguishers are installed, aisles and doorways through which such extinguishers are to be moved shall have a clear and unobstructed width not less than one foot wider than the overall width of the extinguisher.

[California Code of Regulations, Title 19, Division 1, §568(a) through (e)] Fire Extinguisher Size and Placement for Class A Hazards.

(a) Minimum sizes of fire extinguishers for the listed grades of hazards shall be provided on the basis of California Code of Regulations, Title 19, Division 1, Section 568, Table 2, except as modified by California Code of Regulations, Title 19, Division 1, Section 568(d). Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in California Code of Regulations, Title 19, Division 1, Section 568, Table 2, except as modified by California Code of Regulations, Title 19, Division 1, Section 568(d).

(b) Certain smaller fire extinguishers which are charged with a multipurpose dry chemical or halogenated agent are rated on Class B and Class C fires, but having insufficient effectiveness to earn the minimum 1-A rating even though they have value in extinguishing smaller Class A fires. They shall not be used to meet the requirements of California Code of Regulations, Title 19, Division 1, Section 568, Table 2.

TITLE 19, DIVISION 1, SECTION 568, TABLE 2

	Light (Low) Hazard Occupancy	***Ordinary (Moderate) Hazard Occupancy***	***Extra (High) Hazard Occupancy***
Minimum rated single extinguisher	*2-A*	*2-A*	*4-A**
Maximum floor area per unit of A	*3,000 square feet*	*1,500 square feet*	*1,000 square feet*
Maximum floor area for extinguisher	*11,250 square feet*	*11,250 square feet*	*11,250 square feet*
Maximum travel distance to extinguisher	*75 feet*	*75 feet*	*75 feet*

** Two $2^1/_2$-gallon (9.46 L) water-type extinguishers can be used to fulfill the requirement of one 4-A rated extinguisher.*
Note: 1 foot = 0.305 m, 1 square foot = 0.0929 m^2.

(c) Extinguishers as specified in California Code of Regulations, Title 19, Division 1, Section 568, Table 2 may be replaced by uniformly spaced $1^1/_2$ inch (3.810 cm) hose stations for use by the occupants of the building. When hose stations are so provided, they shall conform to Part 9, Title 24, California Code of Regulations, Chapter 9. The location of hose stations and the placement of fire extinguishers shall be in such a manner that the hose stations do not replace more than every other extinguisher.

(d) Where the floor area of a building is less than that specified in California Code of Regulations, Title 19, Division 1, Section 568, Table 2, at least one extinguisher of the minimum size recommended shall be provided.

(e) The protection requirements may be fulfilled with extinguishers of a higher rating provided the travel distance from anywhere in the building to such larger extinguishers shall not exceed 75 feet (22.7 m), as shown in California Code of Regulations, Title 19, Division 1, Section 568, Table 2 above.

[California Code of Regulations, Title 19, Division 1, §569(a) through (c)] Fire Extinguisher Size and Placement for Class B Fires Other than for Fires in Flammable Liquids of Appreciable Depth.

(a) Minimum sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of California Code of Regulations, Title 19, Division 1, Section 569, Table 3. Extinguishers shall be located so that the maximum travel distances from anywhere in the building shall not exceed those specified in the table used.

***Exception:** Extinguishers of lesser rating, desired for small specific hazards within the general hazard area, may be used, but shall not be considered as fulfilling any part of the requirements of California Code of Regulations, Title 19, Division 1, Section 569, Table 3.*

TITLE 19, DIVISION 1, SECTION 569, TABLE 3			
Type of Hazard	***Basic Minimum Extinguisher Rating***	***Maximum Travel Distance to Extinguishers (in feet)***	***(in meters)***
Light (low)	*5B* *10B*	*30* *50*	*9.15* *15.25*
Ordinary (moderate)	*10B* *20B*	*30* *50*	*9.15* *15.25*
Extra (high)	*40B* *80B*	*30* *50*	*9.15* *15.25*
Note 1. The specified rating does not imply that fires of the magnitudes indicated by these ratings will occur, but rather to give the operators more time and agent to handle difficult spill fires that may occur. *Note 2. For fires involving water-soluble flammable liquids, see California Code of Regulations, Title 19, Division 1, Section 566(d).* *Note 3. For specific hazard applications, see California Code of Regulations, Title 19, Division 1, Section 566.*			

(b) Two or more extinguishers of lower rating shall not be used to fulfill the protection requirements of California Code of Regulations, Title 19, Division 1, Section 569, Table 3.

(c) The protection requirements may be fulfilled with extinguishers of high ratings, provided the travel distance to such larger extinguishers shall not exceed 50 feet (15.25 m), as shown in California Code of Regulations, Title 19, Division 1, Section 569, Table 3.

[California Code of Regulations, Title 19, Division 1, §570(a) through (e)] Fire Extinguisher Size and Placement for Class B Fires in Flammable Liquids of Appreciable Depth.

(a) Portable fire extinguishers shall not be installed as the sole protection for flammable liquid hazards of appreciable depth [greater than $^1/_4$ inch (0.64 cm)] where the surface area exceeds 10 square feet (0.93 m^2).

***Exception:** Where personnel who are trained in extinguishing fires in the protected hazards are available on the premises, the maximum surface area shall not exceed 20 square feet. (1.86 m^2).*

(b) For flammable liquid hazards of appreciable depth, a Class B fire extinguisher shall be provided on the basis of at least two numerical units of Class B extinguishing potential per square feet (0.0929 m^2) of flammable liquid surface of the largest hazard area. For fires involving cooking grease or water-soluble flammable liquids, see California Code of Regulations, Title 19, Division 1, Section 566(b) and 566(d).

***Exception:** AFFF- or FFFP-type extinguishers may be provided on the basis of a 1B rating of protection per square foot of hazard.*

(c) Two or more extinguishers of lower ratings shall not be used in lieu of the extinguisher required for the largest hazard area.

***Exception:** Up to three AFFF or FFFP extinguishers may be used to fulfill the requirements provided the sum of the Class B ratings meets or exceeds the value required for the largest hazard area.*

(d) Travel distances for portable extinguishers shall not exceed 50 feet (15.25 m) as shown in California Code of Regulations, Title 19, Division 1, Section 569, Table 3.

(e) Scattered or widely separated hazards shall be individually protected. An extinguisher in the proximity of a hazard shall be carefully located to be accessible in the presence of a fire without undue danger to the operator.

[California Code of Regulations, Title 19, Division 1, §571(a)] Fire Extinguisher Size and Placement for Class C Hazards.

(a) Fire extinguishers with Class C ratings shall be required where energized electrical equipment can be encountered which would require a nonconducting extinguishing medium. This requirement includes situations where fire either directly involves or surrounds electrical equipment. Since the fire itself is a Class A or Class B hazard, the fire extinguishers shall be sized and located on the basis of the anticipated Class A or Class B hazard.

***Note:** Electrical equipment should be de-energized as soon as possible to prevent reigniting.*

TABLE 906.3(1)—FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS			
	LIGHT (Low) HAZARD OCCUPANCY	**ORDINARY (Moderate) HAZARD OCCUPANCY**	**EXTRA (High) HAZARD OCCUPANCY**
Minimum-rated single extinguisher	2-A[c]	2-A	4-A[a]
Maximum floor area per unit of A	3,000 square feet	1,500 square feet	1,000 square feet
Maximum floor area for extinguisher[b]	11,250 square feet	11,250 square feet	11,250 square feet
Maximum distance of travel to extinguisher	75 feet	75 feet	75 feet
For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L. a. Two $2^1/_2$-gallon water-type extinguishers shall be deemed the equivalent of one 4-A rated extinguisher. b. *California Code of Regulations, Title 19, Division 1, Chapter 3* concerning application of the maximum floor area criteria. c. Two water-type extinguishers, each with a 1-A rating, shall be deemed the equivalent of one 2-A rated extinguisher for Light (Low) Hazard Occupancies.			

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TABLE 906.3(2)—FIRE EXTINGUISHERS FOR FLAMMABLE OR COMBUSTIBLE LIQUIDS WITH DEPTHS OF LESS THAN OR EQUAL TO 0.25 INCH[a]		
TYPE OF HAZARD	**BASIC MINIMUM EXTINGUISHER RATING**	**MAXIMUM DISTANCE OF TRAVEL TO EXTINGUISHERS (feet)**
Light (Low)	5-B	30
	10-B	50
Ordinary (Moderate)	10-B	30
	20-B	50
Extra (High)	40-B	30
	80-B	50

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. For requirements on water-soluble flammable liquids and alternative sizing criteria, see *California Code of Regulations, Title 19, Division 1, Chapter 3.*

906.3.1 Class A fire hazards. The minimum sizes and distribution of portable fire extinguishers for occupancies that involve primarily Class A fire hazards shall comply with Table 906.3(1).

906.3.2 Class B fire hazards. Portable fire extinguishers for occupancies involving flammable or combustible liquids with depths less than or equal to 0.25 inch (6.4 mm) shall be selected and placed in accordance with Table 906.3(2).

Portable fire extinguishers for occupancies involving flammable or combustible liquids with a depth of greater than 0.25 inch (6.4 mm) shall be selected and placed in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 3.*

906.3.3 Class C fire hazards. Portable fire extinguishers for Class C fire hazards shall be selected and placed on the basis of the anticipated Class A or B hazard.

906.3.4 Class D fire hazards. Portable fire extinguishers for occupancies involving combustible metals shall be selected and placed in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 3.*

906.4 Cooking equipment fires. Fire extinguishers provided for the protection of cooking equipment shall be of an approved type compatible with the automatic fire-extinguishing system agent. Cooking equipment involving solid fuels or vegetable or animal oils and fats shall be protected by a Class K-rated portable extinguisher in accordance with Sections 906.1, Item 2, 906.4.1 and 906.4.2 as applicable.

[California Code of Regulations, Title 19, Division 1, §573(a) through (c)] Fire Extinguisher Size and Placement for Commercial Cooking Operations.

(a) Fire extinguishers with a Class K rating shall be provided for hazards where there is a potential for fires involving combustible cooking media (vegetable or animal oils and fats).

(b) Maximum travel distance shall not exceed 30 feet (9.15 m) from the hazard to the extinguishers.

(c) Additional fire extinguishers, required for the control of other classes of fires, shall be provided for commercial cooking areas as required by California Code of Regulations, Title 19, Division 1, Section 567.

906.4.1 Portable fire extinguishers for solid fuel cooking appliances. Solid fuel cooking appliances, whether or not under a hood, with fireboxes 5 cubic feet (0.14 m^3) or less in volume shall have a minimum 2.5-gallon (9 L) or two 1.5-gallon (6 L) Class K wet-chemical portable fire extinguishers located in accordance with Section 906.1.

906.4.2 Class K portable fire extinguishers for deep fat fryers. Where hazard areas include deep fat fryers, listed Class K portable fire extinguishers shall be provided as follows:

1. For up to four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity.
2. For every additional group of four fryers having a maximum cooking medium capacity of 80 pounds (36.3 kg) each: one additional Class K portable fire extinguisher of a minimum 1.5-gallon (6 L) capacity shall be provided.
3. For individual fryers exceeding 6 square feet (0.55 m^2) in surface area: Class K portable fire extinguishers shall be installed in accordance with the extinguisher manufacturer's recommendations.

906.5 Conspicuous location. Portable fire extinguishers shall be located in conspicuous locations where they will have ready access and be immediately available for use. These locations shall be along normal paths of travel, unless the fire code official determines that the hazard posed indicates the need for placement away from normal paths of travel.

[California Code of Regulations, Title 19, Division 1, §567.5] Physical Damage Protection.

Extinguishers installed under conditions where they are subject to physical damage, (e.g., from impact, vibration, the environment) shall be adequately protected.

906.6 Unobstructed and unobscured. Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, means shall be provided to indicate the locations of extinguishers.

906.7 Hangers and brackets. Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangers or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer's installation instructions.

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[California Code of Regulations, Title 19, Division 1, §567.3] Installation.

Portable fire extinguishers other than wheeled types shall be securely installed on the hanger or in the bracket supplied or placed in cabinets or wall recesses. The hanger or bracket shall be securely and properly anchored to the mounting surface in accordance with the manufacturer's instructions.Wheeled-type fire extinguishers shall be located in a designated location.

[California Code of Regulations, Title 19, Division 1, §567.4] Brackets.

Extinguishers installed under conditions where they are subject to dislodgement shall be installed in brackets specifically designed to cope with this problem.

[California Code of Regulations, Title 19, Division 1, §567.6] Mounting.

Fire extinguishers having a gross weight not exceeding 40 pounds (18.14 kg) shall be installed so that the top of the fire extinguisher is not more than 5 feet (1.53 m) above the floor. Fire extinguishers having a gross weight greater than 40 pounds (18.14 kg) (except wheeled types) shall be so installed that the top of the fire extinguisher is not more than 3 $^{1}/_{2}$ feet (1.07 m) above the floor. In no case shall the clearance between the bottom of the extinguisher and the floor be less than 4 inches (10.2 cm).

906.8 Cabinets. Cabinets used to house portable fire extinguishers shall not be locked.

Exceptions:

1. Where portable fire extinguishers subject to malicious use or damage are provided with a means of ready access.
2. In Group I-3 occupancies and in mental health areas in Group I-2 occupancies, access to portable fire extinguishers shall be permitted to be locked or to be located in staff locations provided that the staff has keys.

[California Code of Regulations, Title 19, Division 1, §567.2] Cabinets.

Cabinets housing extinguishers shall not be locked.

***Exception:** Where extinguishers are subject to malicious use, locked cabinets may be used provided they include a means of emergency access and are approved by the authority having jurisdiction.*

[California Code of Regulations, Title 19, Division 1, §567.7] Sealed Cabinets.

Where extinguishers are installed in closed cabinets that are exposed to elevated temperatures, the cabinets shall be provided with screened openings and drains.

906.9 Extinguisher installation. The installation of portable fire extinguishers shall be in accordance with Sections 906.9.1 through 906.9.3.

906.9.1 Extinguishers weighing 40 pounds or less. Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 5 feet (1524 mm) above the floor.

906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that their tops are not more than 3.5 feet (1067 mm) above the floor.

906.9.3 Floor clearance. The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall be not less than 4 inches (102 mm).

906.10 Wheeled units. Wheeled fire extinguishers shall be conspicuously located in a designated location.

SECTION 907—FIRE ALARM AND DETECTION SYSTEMS

907.1 General. This section covers the application, installation, performance and maintenance of fire alarm systems and their components in new and existing buildings and structures. The requirements of Section 907.2 are applicable to new buildings and structures. The requirements of Section 907.9 are applicable to existing buildings and structures.

907.1.1 Construction documents. Construction documents for fire alarm systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code; the *California Building Code*; and relevant laws, ordinances, rules and regulations, as determined by the fire code official.

907.1.2 Fire alarm shop drawings. Shop drawings for fire alarm systems shall be prepared in accordance with NFPA 72 and submitted for review and approval prior to system installation. *All plans and shop drawings shall use the symbols identified in NFPA 170, Standard for Fire Safety and Emergency Symbols.*

***Exception:** Other symbols are allowed where approved by the enforcing agency.*

907.1.3 Equipment. Systems and components shall be *California State Fire Marshal* listed and approved *in accordance with California Code of Regulations, Title 19, Division 1* for the purpose for which they are installed.

***907.1.4 Fire-walls and fire barrier walls.** For the purpose of Section 907, fire walls and fire barrier walls shall not define separate buildings.*

***907.1.5 Fire alarm use.** A fire alarm system shall not be used for any purpose other than fire warning or mass notification and where permitted by NFPA 72.*

907.2 Where required—new buildings and structures. An approved fire alarm system installed in accordance with the provisions of this code and NFPA 72 shall be provided in new buildings and structures in accordance with Sections 907.2.1 through *907.2.29* and provide occupant notification in accordance with Section 907.5, unless other requirements are provided by another section of this code.

Not fewer than one manual fire alarm box shall be provided in an approved location to initiate a fire alarm signal for fire alarm systems employing automatic fire detectors or waterflow detection devices. Where other sections of this code allow elimination of

fire alarm boxes due to sprinklers *or automatic fire alarm systems*, a single fire alarm box shall be installed *at a location approved by the enforcing agency.*

Exceptions:

1. The manual fire alarm box is not required for fire alarm systems dedicated to elevator recall control and supervisory service *and fire sprinkler monitoring.*
2. The manual fire alarm box is not required for Group R-2 occupancies unless required by the fire code official to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual fire alarm box shall not be located in an area that is open to the public.
3. *The manual fire alarm box is not required to be installed when approved by the fire code official.*

907.2.1 Group A. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group A occupancies where the occupant load due to the assembly occupancy is 300 or more, or where the Group A occupant load is more than 100 persons above or below the lowest level of exit discharge. Group A occupancies not separated from one another in accordance with Section 707.3.10 of the *California Building Code* shall be considered as a single occupancy for the purposes of applying this section. Portions of Group E occupancies occupied for assembly purposes *with an occupant load of less than 1000* shall be provided with a fire alarm system as required for the Group E occupancy.

Exceptions:

1. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.
2. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for Group A-5 outdoor bleacher-type seating having an occupant load of greater than or equal to 300 and less than 15,000 occupants, provided that all of the following are met:
   - 2.1. A public address system with standby power is provided.
   - 2.2. Enclosed spaces attached to or within 5 feet (1524 mm) of the outdoor bleacher type seating compose, in the aggregate, a maximum of 10 percent of the overall area of the outdoor bleacher-type seating or 1,000 square feet (92.9 m^2), whichever is less.
   - 2.3. Enclosed accessory spaces under or attached to the outdoor bleacher-type seating shall be separated from the bleacher-type seating in accordance with Section 1030.1.1.1.
   - 2.4. All means of egress from the bleacher-type seating are open to the outside.
3. Manual fire alarm boxes and the associated occupant notification system or emergency voice/alarm communication system are not required for temporary Group A-5 outdoor bleacher-type seating, provided that all of the following are met:
   - 3.1. There are no enclosed spaces under or attached to the outdoor bleacher-type seating.
   - 3.2. The bleacher-type seating is erected for a period of less than 180 days.
   - 3.3. Evacuation of the bleacher-type seating is included in an approved fire safety plan.

Every Group A building used for educational purposes shall be provided with a manual or automatic fire alarm system. This provision shall apply to, but shall not necessarily be limited to, every community college and university.

Exception: *Privately owned trade or vocational schools or any firm or company which provides educational facilities and instructions for its employees.*

907.2.1.1 System initiation in Group A occupancies with an occupant load of 1,000 or more. Activation of the fire alarm in Group A occupancies with an occupant load of 1,000 or more shall initiate a signal using an emergency voice/alarm communications system in accordance with Section 907.5.2.2. *For Group A occupancies with an occupant load of 10,000 or more, see Section 907.2.1.3.*

Exception: Where approved, the prerecorded announcement is allowed to be manually deactivated for a period of time, not to exceed 3 minutes, for the sole purpose of allowing a live voice announcement from an approved, constantly attended location.

907.2.1.2 Emergency voice/alarm communication system captions. Stadiums, arenas and grandstands required to caption audible public announcements shall be in accordance with Section 907.5.2.2.4.

907.2.1.3 Public address system. *Pursuant to Health and Safety Code Section 13108.9, for all buildings or structures constructed on or after July 1, 1991, which are intended for public assemblies of 10,000 or more persons, a public address system with an emergency backup power system shall be required.*

907.2.2 Group B. A manual fire alarm system, which activates the occupant notification system in accordance with Section 907.5, shall be installed in Group B occupancies where one of the following conditions exists:

1. The combined Group B occupant load of all floors is 500 or more.
2. The Group B occupant load is more than 100 persons above or below the lowest level of exit discharge.
3. The fire area contains an ambulatory care facility.
4. *For Group B occupancies containing educational facilities, see Section 907.2.2.2.*

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.2.1 Ambulatory care facilities. Fire areas containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 provided that the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.2.2 Laboratories involving research and development or testing. A fire alarm system activated by an air-sampling-type smoke detection system or a radiant-energy-sensing detection system shall be installed throughout the entire fire area utilized for the research and development or testing of lithium-ion or lithium metal batteries.

907.2.2.3 Group B Educational facilities. *Every Group B building used for educational purposes shall be provided with a manual or automatic fire alarm system. This provision shall apply to, but shall not necessarily be limited to, every community college and university.*

Exception: *Privately owned trade or vocational schools or any firm or company which provides educational facilities and instructions for its employees.*

907.2.3 Group E. *An automatic* manual fire alarm system that initiates the occupant notification signal utilizing an emergency voice/alarm communication system meeting the requirements of Section 907.5.2.2 and installed in accordance with Section 907.6 shall be installed in Group E occupancies *with an occupant load of 50 or more persons or containing more than one classroom or one or more rooms used for Group E or I-4 child-care purposes in accordance with this section*. Where automatic sprinkler systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system. *One additional manual fire alarm box shall be located at the administration office or location approved by the AHJ.*

Exceptions:

1. *For public school state funded construction projects see Section 907.2.29.*
2. *For public schools see Section 907.2.3.7.*
3. *For private schools see Section 907.2.3.8.*

907.2.3.1 System connection. *Where more than one fire alarm control unit is used at the school campus, they shall be interconnected and shall operate all notification appliances.*

Exception: *Interconnection of fire alarm control units is not required when all of the following are provided:*

1. *Buildings that are separated a minimum of 20 feet (6096 mm) and in accordance with the California Building Code; and*
2. *There is a method of two-way communication between each classroom and the school administrative office approved by the fire enforcing agency; and*
3. *A method of manual activation of each fire alarm system is provided.*

907.2.3.2 Assemblies located within a Group E occupancy. *Assembly occupancies with an occupant load of less than 1,000 and located within a Group E occupancy campus or building shall be provided with a fire alarm system as required for the Group E occupancy.*

907.2.3.3 Notification. *The fire alarm system notification shall comply with the requirements of Section 907.5.*

907.2.3.4 Annunciation. *Annunciation of the fire alarm system shall comply with the requirements of Section 907.6.4.1.*

907.2.3.5 Monitoring*. School fire alarm systems shall be monitored in accordance with Section 907.6.6.4.*

907.2.3.6 Automatic fire alarm system. *Automatic detection shall be provided in accordance with this section.*

907.2.3.6.1 Smoke detectors. *Smoke detectors shall be installed at the ceiling of every room and in "ceiling-plenums" utilized for environmental air. Where the ceiling is attached directly to the underside of the roof structure, smoke detectors shall be installed on the ceiling only.*

Exception: *Where the environment or ambient conditions exceed smoke detector installation guidelines, heat detectors or fire sprinklers shall be used.*

907.2.3.6.2 Heat detectors. *Heat detectors shall be installed in combustible spaces where sprinklers or smoke detectors are not installed.*

907.2.3.7 Public school campuses. *An automatic fire alarm system in compliance with Section 907.2.3 shall be provided in new buildings for all occupancies on Kindergarten through 12th grade public school campuses.*

Exceptions:

1. *A manual fire alarm system may be provided for a relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. Also see CCR, Title 24, Part 1, California Administrative Code, Section 4-314 for definition of relocatable building.*
2. *A fire alarm system is not required for detached buildings designed and used for non-instructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:*

   Concession Stand
   Press Box
   Restroom Facilities

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Shade Structure
Snack Bar
Storage Building
Ticket Booth

907.2.3.8 Private schools. *An automatic fire alarm system shall be provided in new buildings of private schools.*

Exception: *Automatic detection devices are not required where an approved automatic sprinkler system is installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.*

907.2.3.9 Day care, Group E.

907.2.3.9.1 *An automatic fire alarm system shall be provided in all buildings used as or containing a Group E day care.*

Exception: *Automatic detection devices are not required where an approved automatic sprinkler system is installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate on sprinkler water flow and manual activation is provided from a normally occupied location.*

907.2.3.9.2 *Smoke detectors shall be installed in every room used for sleeping or napping.*

907.2.3.10 Day care, Group E or Group I-4 located on a public school campus. *An automatic fire alarm system shall be provided in all buildings used as or containing a Group E or Group I-4 day care.*

907.2.4 Group F. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group F occupancies where both of the following conditions exist:

1. The Group F occupancy is two or more stories in height.
2. The Group F occupancy has a combined occupant load of 500 or more above or below the lowest level of exit discharge.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.4.1 Manufacturing involving lithium-ion or lithium metal batteries. A fire alarm system activated by an air-sampling-type smoke detection system or a radiant-energy-sensing detection system shall be installed throughout the entire fire area where lithium-ion or lithium metal batteries are manufactured; and where the manufacturer of vehicles, energy storage systems or equipment containing lithium-ion or lithium metal batteries where the batteries are installed as part of the manufacturing process.

907.2.5 Group H. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group H-5 occupancies and in occupancies used for the manufacture of organic coatings. An automatic smoke detection system shall be installed for highly toxic gases, organic peroxides and oxidizers in accordance with Chapters 60, 62 and 63, respectively.

907.2.5.1 Group H occupancies located on the 11th story and above. *Manual fire alarm boxes shall be required on each side of the 2-hour fire-smoke barrier and at each exit on the 11th story and above.*

907.2.6 Group I. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group I occupancies. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in accordance with Sections 907.2.6.1, 907.2.6.2 and 907.2.6.3.3.

Exceptions:

1. *Large family day care.*
2. Occupant notification systems are not required to be activated where private mode signaling installed in accordance with NFPA 72 is approved by the fire code official and staff evacuation responsibilities are included in the fire safety and evacuation plan required by Section 404.

907.2.6.1 ***Reserved.***

907.2.6.2 Group I-2. *A manual and automatic fire alarm system shall be installed in Group I-2 occupancies. Where automatic fire suppression systems or smoke detectors are installed, such systems or detectors shall be connected to the building fire alarm system.*

Exception: *Where an entire facility is used for the housing of persons, none of whom are physically or mentally handicapped or nonambulatory, and are between the ages of 18 and 64, the buildings or structures comprising such facility shall be exempt from the provisions of this subsection relating to the installation of an automatic fire alarm system.*

907.2.6.2.1 Notification. *The fire alarm notification system shall be in accordance with Section 907.5.2.5.*

907.2.6.2.2 Automatic fire detection. *Smoke detectors shall be provided in accordance with this section.*

1. In patient and client sleeping rooms. Actuation of such detectors shall cause a visual display on the corridor side of the room in which the detector is located and shall cause an audible and visual alarm at the respective nurses' station. A nurse call system listed for this function is an acceptable means of providing the audible and visual alarm at the respective nurses' station and corridor room display. Operation of the smoke detector shall not include any alarm verification feature.

Exception: *In patient and client rooms equipped with existing automatic door closers having integral smoke detector, the integral detector is allowed to substitute for the room smoke detector, provided it meets all the required alerting functions.*

2. *Group I-2 nurses' stations. A minimum of one (1) smoke detector shall be installed at the nurses' station and centrally located.*
3. *In waiting areas and corridors onto which they open, in the same smoke compartment, in accordance with Section 407.2.1 of the California Building Code.*
4. *In areas where patients are restrained, smoke detectors shall be installed at ceilings throughout all occupied areas and mechanical/electrical spaces of smoke compartments and in adjacent smoke compartments where occupants of those compartments utilize the same means of egress.*

907.2.6.3 Group I-3 occupancies. Group I-3 occupancies shall be equipped with a manual fire alarm system and automatic smoke detection system installed for alerting staff.

Exception: *An automatic smoke detection system is not required within temporary holding cells.*

907.2.6.3.1 System initiation. Actuation of an automatic fire-extinguishing system, automatic sprinkler system, a manual fire alarm box or a fire detector shall initiate an approved fire alarm signal that automatically notifies staff.

907.2.6.3.2 Manual fire alarm boxes. Manual fire alarm boxes are not required to be located in accordance with Section 907.4.2 where the fire alarm boxes are provided at staff-attended locations having direct supervision over areas where manual fire alarm boxes have been omitted.

907.2.6.3.2.1 Manual fire alarms boxes in detainee areas. Manual fire alarm boxes are allowed to be locked in areas occupied by detainees, provided that staff members are present within the subject area and have keys readily available to operate the manual fire alarm boxes.

907.2.6.3.3 Automatic smoke detection system. An automatic smoke detection system shall be installed throughout resident housing areas, including sleeping units and contiguous day rooms, group activity spaces and other common spaces normally open to *inmates*.

Exceptions:

1. Other approved smoke detection arrangements *may be used to prevent damage or tampering or for other purposes provided the function of detecting any fire is fulfilled and the location of the detectors is such that the speed of detection will be equivalent to that provided by the spacing and location required in accordance with NFPA 72 as referenced in Chapter 80. This may include the location of detectors in return air ducts from cells, behind grilles or in other locations. Spot type, combination duct and open area smoke detectors may be used when located not more than 14 inches (356 mm) from the return air grill. For initiation and annunciation purposes, these detectors may be combined in groups of four. The fire code official having jurisdiction, however, must approve the proposed equivalent performance of the design.*
2. *For detention housing and/or mental health housing area(s), including correctional medical and mental health uses, automatic smoke detection system in sleeping units shall not be required when all of the following conditions are met:*
   - *2.1. All rooms, including the inmate cells, are provided with an automatic sprinkler system in accordance with Section 903.3.1.1.*
   - *2.2. Building is continuously staffed by a correctional officer at all times.*
3. Smoke detectors are not required *to be installed in inmate cells with two or fewer occupants in detention facilities which do not have a correctional medical and mental health use.*
4. *Smoke detectors are not required to be installed in inmate day rooms of detention facilities where 24-hour direct visual supervision is provided by a correctional officer(s) and a manual fire alarm box is located in the control room.*

907.2.6.3.4 System annunciation. *A staff alerting fire alarm shall sound at all staff control stations on the floor of activation and an audible and visual signal shall be indicated on an annunciator at the facility control center upon activation of any automatic extinguishing system, automatic detection system or any smoke detector or manual actuating or initiating device. In addition, where there are staff-control stations on the floor, an audible, visual and manual alarm shall be located in each staff control station.*

Fire and trouble signals of fire alarm systems and sprinkler water-flow and supervisory signals of extinguishing systems shall be annunciated in an area designated as the facility control center which shall be constantly attended by staff personnel. All such signals shall produce both an audible signal and visual display at the facility control center indicating the building, floor zone or other designated area from which the signal originated, in accordance with Section 907.6.4.

All local detention facilities within the scope of Section 6031.4 of the Penal Code shall have an automatic smoke detection system. A manual fire alarm-initiating device shall be installed in all guard control stations and shall be capable of alerting personnel in a central control point to the presence of fire or smoke within the facility.

907.2.6.4 Group I-4 occupancies. *An automatic smoke detection system shall be installed throughout the Group I-4 occupancies, including contiguous day rooms, group activity spaces and other common spaces normally occupied by the clients. Group I-4 facilities located above the first story shall comply with the provisions of Section 436.1.*

907.2.6.5 Large family day care. *Every large family day-care home shall be provided with at least one manual fire alarm box at a location approved by the enforcing agency. Such device shall actuate a fire alarm signal, which shall be audible throughout the facility at a minimum level of 15 db above ambient noise level. These devices need not be interconnected to any other fire alarm device, have a control panel or be electrically supervised or provided with emergency power. Such device or devices shall be attached to the structure and must be a device that is listed and approved by the Office of the State Fire Marshal.*

907.2.7 Group M. Fire alarm systems shall be required in Group M occupancies in accordance with Sections 907.2.7.1 and 907.2.7.2.

907.2.7.1 Occupant load. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group M occupancies where one of the following conditions exists:

1. The combined Group M occupant load of all floors is 500 or more persons.
2. The Group M occupant load is more than 100 persons above or below the lowest level of exit discharge.

Exceptions:

1. A manual fire alarm system is not required in covered or open mall buildings complying with Section 402 of the *California Building Code*.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 and the occupant notification appliances will automatically activate throughout the notification zones upon sprinkler water flow.

907.2.7.1.1 Occupant notification. During times that the building is occupied, the initiation of a signal from a manual fire alarm box or from a waterflow switch shall not be required to activate the alarm notification appliances when an alarm signal is activated at a constantly attended location from which evacuation instructions shall be initiated over an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

907.2.7.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air-sampling-type smoke detection system or a radiant-energy-sensing detection system shall be installed in a room or space within a Group M occupancy where required for the storage of lithium-ion or lithium metal batteries in accordance with Section 320.

907.2.8 Group R-1. Fire alarm systems and smoke alarms shall be installed in Group R-1 occupancies as required in Sections 907.2.8.1 through 907.2.8.3.

907.2.8.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-1 occupancies.

Exceptions:

1. A manual fire alarm system is not required in buildings not more than two stories in height where all individual sleeping units and contiguous attic and crawl spaces to those units are separated from each other and public or common areas by not less than 1-hour fire partitions and each individual sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required throughout the building where all of the following conditions are met:
   2.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   2.2. The notification appliances will activate upon sprinkler water flow.
   2.3. Not fewer than one manual fire alarm box is installed at an approved location.

907.2.8.2 Automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed throughout all interior corridors serving sleeping units.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving sleeping units and where each sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

907.2.8.3 Smoke alarms. Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.

907.2.9 *Groups* R-2, *R-2.1 and R-2.2*. Fire alarm systems and smoke alarms shall be installed in Group R-2 *and R-2.1* occupancies as required in Sections 907.2.9.1 through *907.2.10.2.1.1. Group R-2.2 shall be equipped throughout with an automatic fire alarm system and shall have a manual fire alarm pull station at the 24-hour staff watch office.*

907.2.9.1 Manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies where any of the following conditions apply:

1. Any dwelling unit or sleeping unit is located three or more stories above the lowest level of exit discharge.
2. Any dwelling unit or sleeping unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit or sleeping unit.
3. The building contains more than 16 dwelling units or sleeping units.
4. *Congregate residences with more than 16 occupants.*

Exceptions:

1. A fire alarm system is not required in buildings not more than two stories in height where all dwelling units or sleeping units and contiguous attic and crawl spaces are separated from each other and public or common areas by not less than 1-hour fire partitions and each dwelling unit or sleeping unit has an exit directly to a public way, egress court or yard.
2. Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and the occupant notification appliances will automatically activate throughout the notification zones upon a sprinkler water flow.

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3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1027.6, Exception 3.

907.2.9.2 Smoke alarms. Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.

907.2.9.3 Group R-2 college and university buildings. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-2 occupancies operated by a college or university for student or staff housing in all of the following locations:

1. Common spaces outside of dwelling units and sleeping units.
2. Laundry rooms, mechanical equipment rooms and storage rooms.
3. All interior corridors serving sleeping units or dwelling units.

Required smoke *detectors listed in accordance with UL 268* in dwelling units and sleeping units in Group R-2 occupancies operated by a college or university for student or staff housing shall be interconnected with the fire alarm system *to activate the occupant notification* in accordance with NFPA 72 *and shall comply with Section 907.2.11.8.*

907.2.10 Group S. A fire alarm system shall be installed in a Group S occupancy as required by Sections 907.2.10.1 and 907.2.10.2.

907.2.10.1 Public- and self-storage occupancies. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group S public- and self-storage occupancies three stories or greater in height for interior corridors and interior common areas. Visible notification appliances are not required within storage units.

Exception: Manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, and the occupant notification appliances will activate throughout the notification zones upon sprinkler water flow.

907.2.10.2 Storage of lithium-ion or lithium metal batteries. A fire alarm system activated by an air-sampling-type smoke detection system or a radiant-energy-sensing detection system shall be installed throughout the entire fire area where required for the storage of lithium-ion batteries or lithium metal batteries in accordance with Section 320.

907.2.11 Single- and multiple-station smoke alarms. Listed single- and multiple-station smoke alarms complying with UL 217 shall be installed in accordance with Sections 907.2.11.1 through 907.2.11.7, NFPA 72 and the manufacturer's instructions.

Exception: *For Group R occupancies. A fire alarm system with smoke detectors located in accordance with this section may be installed in lieu of smoke alarms. Upon actuation of the detector, only those notification appliances in the dwelling unit or guest room where the detector is actuated shall activate.*

907.2.11.1 Group R-1. Single- or multiple-station smoke alarms shall be installed in all of the following locations in Group R-1:

1. In sleeping areas.
2. In every room in the path of the means of egress from the sleeping area to the door leading from the sleeping unit.
3. In each story within the sleeping unit, including basements. For sleeping units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.

See Section 907.2.10.8 for specific location requirements.

907.2.11.2 Groups R-2, *R-2.1, R-2.2,* R-3, *R-3.1 and* R-4 and I-1. Single- or multiple-station smoke alarms shall be installed and maintained in Groups R-2, *R-2.1, R-2.2,* R-3, *R-3.1 and* R-4 regardless of occupant load at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.
4. *In a Group R-3.1 occupancies, in addition to the above, smoke alarms shall be provided throughout the habitable areas of the dwelling unit except kitchens.*

See Section 907.2.10.8 for specific location requirements.

907.2.11.2.1 Licensed Group R-2.1 occupancies. *Licensed Group R-2.1 occupancies housing more than six nonambulatory, elderly clients shall be provided with an approved manual and automatic fire alarm system.*

Exceptions: *Buildings housing nonambulatory clients on the first story only and which are protected throughout by the following:*

1. *An approved and supervised automatic sprinkler system, as specified in Sections 903.3.1.1 or 903.3.1.2, which upon activation will initiate the fire alarm system to notify all occupants.*
2. *A manual fire alarm system.*
3. *Smoke alarms required by Section 907.2.11.*

907.2.11.2.1.1 Smoke alarms. *Single- and multiple-station smoke alarms shall be installed in accordance with Section 907.2.11.*

907.2.11.2.2 Group I-4 occupancies. *Large family day-care homes shall be equipped with State Fire Marshal approved and listed single station residential type smoke alarms.*

907.2.11.2.3 Group R-3.1. *In all facilities housing a bedridden client, smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms shall be electrically interconnected so as to cause all smoke alarms to sound a distinctive alarm signal upon actuation of any single smoke alarm. Such alarm signal shall be audible throughout the facility at a minimal level of 15 db above ambient noise level. These devices need not be interconnected to any other fire alarm device, have a control panel, or be electronically supervised or provided with emergency power.*

907.2.11.2.4 Smoke alarms. *Smoke alarms shall be tested and maintained in accordance with the manufacturer's instructions. Smoke alarms that no longer function shall be replaced.*

907.2.11.2.5 Existing Group R occupancies. *See the California Residential Code for existing Group R-3 occupancies or Chapter 11 of the California Fire Code for all other existing Group R occupancies.*

907.2.11.2.6 Group R-4. *A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in Group R-4 occupancies housing nonambulatory clients.*

907.2.11.3 Installation near cooking appliances. *See Section 907.2.11.8.*

907.2.11.4 Installation near bathrooms. *See Section 907.2.11.8.*

907.2.11.5 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit or sleeping unit in Group R or I-1 occupancies, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

907.2.11.6 Power source. In new construction, *and in newly classified Group R-3.1 occupancies,* required smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery back-up shall be connected to an emergency electrical system in accordance with Section 1203. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exception: Smoke alarms are not required to be equipped with battery backup where they are connected to an emergency electrical system that complies with Section 603.

907.2.11.7 Smoke detection system. Smoke detectors listed in accordance with UL 268 and provided as part of the building fire alarm system shall be an acceptable alternative to single- and multiple-station smoke alarms and shall comply with the following:

1. The fire alarm system shall comply with all applicable requirements in Section 907.
2. Activation of a smoke detector in a dwelling unit or sleeping unit shall initiate alarm notification in the dwelling unit or sleeping unit in accordance with Section 907.5.2.
3. Activation of a smoke detector in a dwelling unit or sleeping unit shall not activate alarm notification appliances outside of the dwelling unit or sleeping unit, provided that a supervisory signal is generated and monitored in accordance with Section 907.6.6.

907.2.11.8 Specific location requirements.

Extract from NFPA 72 Section 29.11.3.4 Specific Location Requirements.*

This extract has been provided by NFPA for the Office of the State Fire Marshal adoption by reference as follows:

29.11.3.4 Specific location requirements. *The installation of smoke alarms and smoke detectors shall comply with the following requirements:*

(1) Smoke alarms and smoke detectors shall not be located where ambient conditions, including humidity and temperature, are outside the limits specified by the manufacturer's published instructions.

(2) Smoke alarms and smoke detectors shall not be located within unfinished attics or garages or in other spaces where temperatures can fall below 40°F (4°C) or exceed 100°F (38°C).

(3) Where the mounting surface could become considerably warmer or cooler than the room, such as a poorly insulated ceiling below an unfinished attic or an exterior wall, smoke alarms and smoke detectors shall be mounted on an inside wall.

(4) Smoke alarms and smoke detectors shall not be installed within an area of exclusion determined by a 10-foot (3.0 m) radial distance along a horizontal flow path from a stationary or fixed cooking appliance, unless listed for installation in close proximity to cooking appliances. Smoke alarms and smoke detectors installed between 10 feet (3.0 m) and 20 feet (6.1 m) along a horizontal flow path from a stationary or fixed appliance shall be equipped with an alarm-silencing means or use photoelectric detection.

(5) Smoke alarms or smoke detectors that use photoelectric detection shall be permitted for installation at a radial distance greater than 6 feet (1.8 m) from any stationary or fixed cooking appliance when both of the following conditions are met:

(a) The kitchen or cooking area and adjacent spaces have no clear partitions or headers.

(b) The 10-foot (3.0 m) area of exclusion would prohibit the placement of a smoke alarm or smoke detector required by other sections of this code.

(6) Effective January 1, 2022, smoke alarms and smoke detectors installed between 6 feet (1.8 m) and 20 feet (6.1 m) along a horizontal flow path from a stationary or fixed cooking appliance shall be listed for resistance to common nuisance sources from cooking.

(7) Smoke alarms and smoke detectors shall not be installed within a 36-inch (910 mm) horizontal path from a door to a bathroom containing a shower or tub unless listed for installation in close proximity to such locations.

(8) Smoke alarms and smoke detectors shall not be installed within a 36-inch (910 mm) horizontal path from the supply registers of a forced air heating or cooling system and shall be installed outside of the direct airflow from those registers.

(9) Smoke alarms and smoke detectors shall not be installed within a 36-inch (910 mm) horizontal path from the tip of the blade of a ceiling-suspended (paddle) fan unless the room configuration restricts meeting this requirement.

(10) Where stairs lead to other occupied levels, a smoke alarm or smoke detector shall be located so that smoke rising in the stairway cannot be prevented from reaching the smoke alarm or smoke detector by an intervening door or obstruction.

(11) For stairways leading up from a basement, smoke alarms or smoke detectors shall be located on the basement ceiling near the entry to the stairs.

(12) For tray-shaped ceilings (coffered ceilings), smoke alarms and smoke detectors shall be installed on the highest portion of the ceiling or on the sloped portion of the ceiling within 12 inches (300 mm) vertically down from the highest point.

(13) Smoke alarms and detectors installed in rooms with joists or beams shall comply with the requirements of Section 17.7.3.2.4 of NFPA 72.

(14) Heat alarms and detectors installed in rooms with joists or beams shall comply with the requirements of Section 17.6.3 of NFPA 72.

**For additional requirements or clarification, see NFPA 72.*

907.2.12 Special amusement areas. Fire detection and alarm systems shall be provided in special amusement areas *and throughout the exit access to the point of exit discharge* in accordance with Section 914.7.

907.2.13 High-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access.* *High-rise buildings and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* shall be provided with an automatic smoke detection system in accordance with Section 907.2.13.1, a fire department communication system in accordance with Section 907.2.13.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.

Exceptions:

1. Airport traffic control towers in accordance with Section 907.2.22 of this code and Section 412 of the *California Building Code*.
2. Open parking garages in accordance with Section 406.5 of the *California Building Code*.
3. Buildings with an occupancy in Group A-5 in accordance with Section 303.1 of the *California Building Code*.
4. Low-hazard special occupancies in accordance with Section 503.1.1 of the *California Building Code*.
5. Buildings with an occupancy in Group H-1, H-2 or H-3 in accordance with Section 415 of the *California Building Code*.
6. In Group I-2 *and R-2.1* occupancies, the alarm shall sound at a constantly attended location and occupant notification shall be broadcast by the emergency voice/alarm communication system.

907.2.13.1 Automatic smoke detection. Automatic smoke detection in high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* shall be in accordance with Sections 907.2.13.1.1 and 907.2.13.1.2.

907.2.13.1.1 Area smoke detection. Area smoke detectors shall be provided in accordance with this section. Smoke detectors shall be connected to an automatic fire alarm system. The activation of any detector required by this section shall activate the emergency voice/alarm communication system in accordance with Section 907.5.2.2. In addition to smoke detectors required by Sections 907.2.1 through 907.2.9, smoke detectors shall be located as follows:

1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room that is not provided with sprinkler protection.
2. In each elevator machine room, machinery space, control room and control space and in elevator lobbies.

907.2.13.1.2 Duct smoke detection. *Smoke detectors listed for use in air duct systems shall be provided in accordance with this section and the California Mechanical Code. The activation of any detector required by this section shall initiate a visible and audible supervisory signal at a constantly attended location.* Duct smoke detectors complying with Section 907.3.1 shall be located as follows:

1. In the main return air and exhaust air plenum of each air-conditioning system having a capacity greater than 2,000 cubic feet per minute (cfm) (0.94 m^3/s). Such detectors shall be located in a serviceable area downstream of the last duct inlet.
2. At each connection to a vertical duct or riser serving two or more stories from a return air duct or plenum of an air-conditioning system. In Group R-1 and R-2 occupancies, a smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m^3/s) and serving not more than 10 air-inlet openings.

907.2.13.2 Fire department communication system. Where a wired communication system is approved in lieu of an in-building, two-way emergency responder communication coverage system in accordance with Section 510, the wired fire department communication system shall be designed and installed in accordance with NFPA 72 and shall operate between a fire command center complying with Section 508, elevators, elevator lobbies, emergency and standby power rooms, fire pump rooms, areas of refuge and inside interior exit stairways. The fire department communication device shall be provided at each floor level within the interior exit stairway.

907.2.13.3 Multiple-channel voice evacuation. In buildings with an occupied floor more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, voice evacuation systems for high-rise buildings shall be multiple-channel systems.

907.2.14 Atriums connecting more than two stories. A fire alarm system shall be installed in occupancies with an atrium that connects more than two stories, with smoke detection in locations required by a rational analysis in Section 909.4 and in accordance with the system operation requirements in Section 909.17. The system shall be activated in accordance with Section 907.5. Such occupancies in Group A, E or M shall be provided with an emergency voice/alarm communication system complying with the requirements of Section 907.5.2.2.

907.2.15 High-piled combustible storage areas. An automatic smoke detection system shall be installed throughout high-piled combustible storage areas where required by Section 3206.5.

907.2.16 Aerosol storage uses. Aerosol product rooms and general-purpose warehouses containing aerosol products shall be provided with an approved manual fire alarm system where required by this code.

907.2.17 Lumber, wood structural panel and veneer mills. Lumber, wood structural panel and veneer mills shall be provided with a manual fire alarm system.

907.2.18 Underground buildings with smoke control systems. Where a smoke control system is installed in an underground building in accordance with the *California Building Code*, automatic smoke detectors shall be provided in accordance with Section 907.2.18.1.

907.2.18.1 Smoke detectors. Not fewer than one smoke detector listed for the intended purpose shall be installed in all of the following areas:

1. Mechanical equipment, electrical, transformer, telephone equipment, elevator machine or similar rooms.
2. Elevator lobbies.
3. The main return and exhaust air plenum of each air-conditioning system serving more than one story and located in a serviceable area downstream of the last duct inlet.
4. Each connection to a vertical duct or riser serving two or more floors from return air ducts or plenums of heating, ventilating and air-conditioning systems, except that in Group R occupancies, a listed smoke detector is allowed to be used in each return air riser carrying not more than 5,000 cfm (2.4 m^3/s) and serving not more than 10 air inlet openings.

907.2.18.2 Alarm required. Activation of the smoke control system shall activate an audible alarm at a constantly attended location.

907.2.19 Deep underground buildings. Where the lowest level of a structure is more than 60 feet (18 288 mm) below the finished floor of the lowest level of exit discharge, the structure shall be equipped throughout with a manual fire alarm system, including an emergency voice/alarm communication system installed in accordance with Section 907.5.2.2.

907.2.20 Covered and open mall buildings. Where the total floor area exceeds 50,000 square feet (4645 m^2) within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided. Access to emergency voice/alarm communication systems serving a mall, required or otherwise, shall be provided for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

907.2.21 Residential aircraft hangars. Not fewer than one single-station smoke alarm shall be installed within a residential aircraft hangar as defined in Chapter 2 of the *California Building Code* and shall be interconnected into the residential smoke alarm or other sounding device to provide an alarm that will be audible in all sleeping areas of the dwelling.

907.2.22 Airport traffic control towers. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be provided in airport control towers in accordance with Sections 907.2.22.1 and 907.2.22.2.

Exception: Audible appliances shall not be installed within the control tower cab.

907.2.22.1 Airport traffic control towers with multiple exits and automatic sprinklers. Airport traffic control towers with multiple exits and equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 shall be provided with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Outside each opening into interior exit stairways.
5. Along the single means of egress permitted from observation levels.
6. Outside each opening into the single means of egress permitted from observation levels.

907.2.22.2 Other airport traffic control towers. Airport traffic control towers with a single exit or where sprinklers are not installed throughout shall be provided with smoke detectors in all of the following locations:

1. Airport traffic control cab.
2. Electrical and mechanical equipment rooms.
3. Airport terminal radar and electronics rooms.
4. Office spaces incidental to the tower operation.
5. Lounges for employees, including sanitary facilities.
6. Means of egress.
7. Utility shafts where access to smoke detectors can be provided.

907.2.23 Energy storage systems. An automatic smoke detection system or radiant-energy detection system shall be installed in rooms, areas and walk-in units containing energy storage systems as required in Section 1207.5.4.

907.2.24 Motion Picture and Television Production Studio Sound Stages and Approved Production Facilities

907.2.24.1 Sound Stages—Solid-ceiling Sets and Platforms. *Where required by Chapter 48, all interior solid-ceiling sets over 600 square feet (55.7 m^2) in area, and platforms (when provided) over 600 square feet (55.7 m^2) in area and which exceed 3 feet (914 mm) in height shall be protected by an approved heat detector system. Heat detectors shall be spaced 30 feet (9144 mm) on center or as required by the manufacturer's installation instructions. The fire alarm system shall be connected to an approved supervising station in accordance with Section 907.6.5 or a local alarm which will give an audible signal at a constantly attended location.*

907.2.24.2 Production locations—solid-ceiling sets and platforms. *Where required by Chapter 48 of the California Fire Code, buildings with existing fire protection systems and where production intends to construct solid-ceiling sets over 600 square feet (55.7 m^2) in area, and platforms over 600 square feet (55.7 m^2) in area and which exceed 3 feet (914 mm) in height shall be protected by an approved heat detector system. Heat detectors shall be spaced 30 feet (9144 mm) on center or as required by the manufacturer's installation instructions. The fire alarm system shall be connected to an approved supervising station in accordance with Section 907.6.6 or a local alarm which will give an audible signal at a constantly attended location.*

907.2.24.3 Fire alarm control units. *Fire alarm control units shall be California State Fire Marshal listed and shall be utilized in accordance with their listing. Control units are permitted to be temporarily supported by sets, platforms or pedestals.*

907.2.24.4 Heat detectors.

907.2.24.4.1 *Heat detection required by this section shall be defined as a portable system as it is intended to be reinstalled when platforms or sets are changed.*

907.2.24.4.2 *Heat detectors shall be secured to standard outlet boxes and are allowed to be temporarily supported by sets, platforms or pedestals.*

907.2.24.4.3 *Heat detectors shall be provided for solid-ceiling sets and platforms where required by Section 4805.3 and 4811.14.*

907.2.25 Group C occupancies (Organized Camps).

907.2.25.1 General. *Every building and structure used or intended for sleeping purposes shall be provided with an automatic smoke-detection system.*

Exceptions:

1. *Buildings and structures in existence and in operation prior to January 1, 1985.*
2. *Tents, tent structures and buildings and structures that do not exceed 25 feet (7620 mm) in any lateral dimensions and where such building or structure is not more than one story.*

907.2.25.2 Camp fire alarm. *Every organized camp shall provide and maintain audible appliances or devices suitable for sounding a fire alarm. Such audible appliances or devices may be of any type acceptable to the enforcing agency, provided they are distinctive in tone from all other signaling devices or systems and shall be audible throughout the camp premises. When an automatic fire alarm system is provided, as required by Section 450.6.6 of the California Building Code, all audible appliances required by this section shall be of the same type as that used in the automatic system.*

[California Code of Regulations, Title 19, Division 1, §3.12] Fire Alarm.

Every organized camp shall provide and maintain an audible appliance or audible appliances suitable for sounding a fire alarm. Such audible appliance or audible appliances may be of any type acceptable to the enforcing agency provided they are distinctive in tone from all other signaling devices or systems and shall be audible throughout the camp premises.

When an automatic fire alarm system is provided, all audible appliances and fire alarm signals as required by this section shall be of the same type as that used in the automatic system.

907.2.26 Fixed guideway and passenger rail transits systems fire alarm and communication systems.

907.2.26.1 General. *Every fixed guideway transit station shall be provided with an approved emergency voice/alarm communication system in accordance with NFPA 72. The emergency voice/alarm communication system shall be designed and installed so that damage to any one speaker will not render any paging zone of the system inoperative.*

Exception: *Open stations.*

907.2.26.2 System components. *Each station fire alarm system shall consist of:*

1. *Fire alarm control unit at a location as permitted by the enforcing agency.*

2. *An alarm annunciator(s). The annunciator(s) shall be located at a point acceptable to the enforcing agency. The annunciator(s) shall indicate the type of device and general location of alarm. All alarm, supervisory and trouble signals shall be transmitted to the local annunciator(s) and the operations control center.*
3. *Manual fire alarm boxes shall be provided throughout passenger platforms and stations.*

   Exception: *Two-way emergency communication reporting devices (emergency telephones) are allowed to be used in lieu of manual fire alarm boxes, as permitted by the enforcing agency. Such devices shall provide two-way communication between the operations control center and each device. Such devices shall be located as required for manual fire alarm boxes, and shall be distinctly identified by signs, coloring or other means acceptable to the enforcing agency.*
4. *Automatic smoke detectors in all ancillary spaces.*

   Exceptions:

   1. *Ancillary spaces protected by an approved fixed automatic extinguishing system; or*
   2. *Ancillary spaces protected by quick-response sprinklers.*
5. *Automatic control of exiting components.*

907.2.26.3 Emergency voice/alarm communication system. *Each station shall be provided with a an emergency voice/alarm communication system capable of transmitting voice, recorded or electronically generated textual messages to all areas of the station. The system(s) shall be configured such that the messages can be initiated from either the Emergency Management Panel (EMP) or the operations control center.*

907.2.26.4 Emergency telephones. *A dedicated two-way emergency communication phone system designed and installed in accordance with NFPA 72 shall be provided in all underground stations to facilitate direct communications for emergency response between remote locations and the EMP.*

907.2.26.4.1. *Remote emergency phones shall be located at ends of station platforms, each hose outlet connection and station valve rooms.*

907.2.26.4.2. *Provisions shall be made in the design of this two-way emergency communication phone system for extensions of the system to the next passenger station or guideway portal.*

907.2.27 Winery caves. *An approved manual fire alarm system conforming to the provisions of Section 907.2.1 shall be provided in all Type 3 winery caves.*

907.2.28 Group L. *A manual fire alarm system shall be installed throughout buildings having Group L occupancy.*

When Group L occupancies are located in mixed use buildings, at least one manual fire alarm box shall be located within the Group L occupancy.

907.2.28.1 Group L occupancies located on the 11th story and above. *Manual fire alarm boxes shall be required on each side of the 2-hour fire-smoke barrier and at each exit on the 11th story and above.*

907.2.29 Public school state-funded construction projects for kindergarten through 12th grade — automatic fire alarm system requirements.

907.2.29.1 Alterations to existing buildings on an existing public school campus. *An automatic fire alarm system shall be provided for all portions within the scope of an alteration project. The provisions of this section shall apply to any public school project on an existing campus and receiving state funds pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code, Sections 17070.10 through 17079. For purposes of this section, an existing campus refers to a school site, where an application for construction of original buildings was made to DSA prior to July 1, 2002.*

Exceptions:

1. *A manual fire alarm system may be provided for a construction project that has an estimated total cost of less than $200,000.*
2. *A manual fire alarm system may be provided for a relocatable building that is sited with the intent that it be at the site for less than three years and is sited upon a temporary foundation in a manner that is designed to permit easy removal. See California Administrative Code, Section 4-314 for definition of relocatable building.*
3. *A fire alarm system is not required for detached buildings designed and used for noninstructional purposes that meet the applicable requirements for that occupancy. Buildings would include, but not be limited to:*

   Concession stand.
   Press box.
   Restroom facilities.
   Shade structure.
   Snack bar.
   Storage building.
   Ticket booth.

907.3 Fire safety functions. Automatic fire detectors utilized for the purpose of performing fire safety functions shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Detectors shall, upon actuation, perform the intended function and activate the alarm notification appliances or activate a visible and audible supervisory signal at a constantly attended location. In buildings not equipped with a fire alarm system, the automatic fire detector shall be powered by

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normal electrical service and, upon actuation, perform the intended function. The detectors shall be located in accordance with NFPA 72.

907.3.1 Duct smoke detectors. Smoke detectors installed in ducts shall be listed for the air velocity, temperature and humidity present in the duct. Duct smoke detectors shall be connected to the building's fire alarm control unit where a fire alarm system is required by Section 907.2. Activation of a duct smoke detector shall initiate a visible and audible supervisory signal at a constantly attended location and shall perform the intended fire safety function in accordance with this code and the *California Mechanical Code*. In facilities that are required to be monitored by a supervising station, duct smoke detectors shall report only as a supervisory signal and not as a fire alarm. They shall not be used as a substitute for required open area detection.

Exceptions:

1. The supervisory signal at a constantly attended location is not required where duct smoke detectors activate the building's alarm notification appliances.
2. In occupancies not required to be equipped with a fire alarm system, actuation of a smoke detector shall activate a visible and an audible signal in an approved location. Smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble.

907.3.2 Special locking systems. Where special locking systems are installed on means of egress doors in accordance with Section 1010.2.13 or 1010.2.12, an automatic *smoke* detection system shall be installed as required by *those sections and Sections 907.3.2.1 through 907.3.2.5.*

907.3.2.1 Delayed egress. *In other than Group I, Group R-2.1 and Group R-4, occupancies for single-story building smoke detectors shall be installed at ceilings throughout all occupied areas and mechanical/electrical spaces. For multiple-story buildings, smoke detectors shall be installed throughout all occupied areas and mechanical/electrical spaces for the story where delayed egress devices are installed. Additional detectors are required on adjacent stories where occupants of those stories utilize the same means of egress.*

Exception: *Refer to Section 907.3.2.4 for Group A courthouse occupancies.*

907.3.2.2 Delayed egress for Group I and R-2.1 occupancies. *Smoke detectors shall be installed at ceilings throughout all occupied areas and mechanical/electrical spaces of smoke-compartments where delayed egress devices are installed. Additional detectors are required in adjacent smoke-compartments where occupants of those compartments utilize the same means of egress.*

907.3.2.3 Delayed egress for Group R-4 occupancies. *In occupancies licensed as residential care facilities for the elderly and housing clients with Alzheimer's disease or dementia, smoke detectors shall be installed at ceilings throughout all occupiable rooms and areas and mechanical/electrical rooms and spaces.*

907.3.2.4 Delayed egress for Group A Courthouse occupancies. *Approved automatic smoke detection systems shall be installed at ceilings in all occupied corridors and mechanical/electrical spaces of occupancies where delayed egress devices are installed.*

907.3.2.5 Controlled egress doors for Group I-2 occupancies. *Smoke detectors shall be installed at ceilings throughout all occupied areas and mechanical/electrical spaces of smoke-compartments where controlled egress doors are installed.*

907.3.3 Elevator emergency operation. Automatic fire detectors installed for elevator emergency operation shall be installed in accordance with the provisions of *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders* and NFPA 72.

907.3.3.1 Hoist way fire detection. *Smoke detectors or other automatic fire detection shall be provided in hoist ways in accordance with NFPA 72 for the following:*

1. *Where required by California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders, to initiate elevator phase I emergency recall.*
2. *Where required by Section 3003.4.3 to activate a hoist way ventilation system.*

907.3.4 Wiring. The wiring to the auxiliary devices and equipment used to accomplish the fire safety functions shall be monitored for integrity in accordance with NFPA 72.

907.4 Initiating devices. Where a fire alarm system is required by another section of this code, occupant notification in accordance with Section 907.5 shall be initiated by one or more of the following. Initiating devices shall be installed in accordance with Sections 907.4.1 through 907.4.3.1.

1. Manual fire alarm boxes.
2. Automatic fire detectors.
3. Automatic sprinkler system waterflow devices.
4. Automatic fire-extinguishing systems.

907.4.1 Protection of fire alarm control unit. In areas that are not continuously occupied, a single smoke detector shall be provided at the location of each fire alarm control unit, notification appliance circuit power extenders and supervising station transmitting equipment.

Exception: Where ambient conditions prohibit installation of a smoke detector, a heat detector shall be permitted.

907.4.2 Manual fire alarm boxes. Where a manual fire alarm system is required by another section of this code, it shall be activated by fire alarm boxes installed in accordance with Sections 907.4.2.1 through 907.4.2.6.

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907.4.2.1 Location. Manual fire alarm boxes shall be located not more than 5 feet (1524 mm) from the entrance to each exit. In buildings not protected by an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, additional manual fire alarm boxes shall be located so that the distance of travel to the nearest box does not exceed 200 feet (60 960 mm).

Exception: *When individual dwelling units are served by a single exit stairway, additional boxes at other than the ground floor may be omitted.*

907.4.2.2 Height. The height of the manual fire alarm boxes shall be not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) measured vertically, from the floor level to the *highest point of the* activating handle or lever of the box. *Manual fire alarm boxes shall also comply with Section 11B-309.4 of the California Building Code.*

Exception: [DSA-AC] *In existing buildings there is no requirement to retroactively relocate existing manual fire alarm boxes to a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) from the floor level to the activating handle or lever of the box.*

907.4.2.3 Color. Manual fire alarm boxes shall be red in color.

907.4.2.4 Signs. Where fire alarm systems are not monitored by an approved supervising station in accordance with Section 907.6.6, an approved permanent sign shall be installed adjacent to each manual fire alarm box that reads: "WHEN ALARM SOUNDS—CALL FIRE DEPARTMENT."

Exception: Where the manufacturer has permanently provided this information on the manual fire alarm box.

907.4.2.5 Protective covers. The fire code official is authorized to require the installation of listed manual fire alarm box protective covers to prevent malicious false alarms or to provide the manual fire alarm box with protection from physical damage. The protective cover shall be transparent or red in color with a transparent face to permit visibility of the manual fire alarm box. Each cover shall include proper operating instructions. A protective cover that emits a local alarm signal shall not be installed unless approved. Protective covers shall not project more than that permitted by Section 1003.3.3.

907.4.2.6 Unobstructed and unobscured. Manual fire alarm boxes shall be provided with ready access, unobstructed, unobscured and visible at all times.

907.4.2.7 Operation. *Manual fire alarm boxes shall be operable with one hand including boxes with protective covers.*

907.4.3 Automatic smoke detection. Where an automatic smoke detection system is required, it shall utilize smoke detectors unless ambient conditions prohibit such an installation. In spaces where smoke detectors cannot be utilized due to ambient conditions, approved automatic heat detectors shall be permitted.

907.4.3.1 Automatic sprinkler system. For conditions other than specific fire safety functions noted in Section 907.3, in areas where ambient conditions prohibit the installation of smoke detectors, an automatic sprinkler system installed in such areas in accordance with Section 903.3.1.1 or 903.3.1.2 and that is connected to the fire alarm system shall be approved as automatic heat detection.

907.5 Occupant notification. Occupant notification by fire alarms shall be in accordance with Sections 907.5.1 through *907.5.2.5*. Occupant notification by smoke alarms in Group R-1 and R-2 occupancies shall comply with Section 907.5.2.1.3.2.

907.5.1 Alarm activation and annunciation. Upon activation, fire alarm systems shall initiate occupant notification and shall annunciate at the fire alarm control unit, or where allowed elsewhere by Section 907, at a constantly attended location.

907.5.1.1 Presignal feature. A presignal feature shall only be provided where approved. The presignal shall be annunciated at an approved, constantly attended location, having the capability to activate the occupant notification system in the event of fire or other emergency.

Exception: *A presignal feature shall not be permitted to be installed in a Group I-2 or R-2.1 occupancy.*

907.5.2 Alarm notification appliances. Alarm notification appliances shall be provided and shall be listed for their purpose.

907.5.2.1 Audible alarms. Audible alarm notification appliances shall be provided and emit a distinctive sound that is not to be used for any purpose other than that of a fire alarm. *In Group I-2 occupancies, audible appliances located in patient areas shall be only chimes or similar sounding appliances for alerting staff. See Section 907.5.2.5.*

Exceptions:

1. Audible alarm notification appliances are not required in *patient* areas of Group I-2 occupancies that are in compliance with Section *907.5.2.5*.
2. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2 *care* suite shall be an acceptable alternative to the installation of audible alarm notification appliances throughout a suite or unit in Group I-2 occupancies that are in compliance with Section *907.5.2.5*.
3. Where provided, audible notification appliances located in each enclosed occupant evacuation elevator lobby in accordance with Section 3008.9.1 of the *California Building Code* shall be connected to a separate notification zone for manual paging only.

907.5.2.1.1 Average sound pressure. The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building.

907.5.2.1.2 Maximum sound pressure. The total sound pressure level produced by combining the ambient sound pressure level with all audible notification appliances operating shall not exceed 110 dBA at the minimum hearing distance from the

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audible appliance. Where the average ambient noise is greater than 105 dBA, visible alarm notification appliances shall be provided in accordance with NFPA 72 and audible alarm notification appliances shall not be required.

907.5.2.1.3 Audible alarm signal frequency in Group R-1, R-2 and I-1 sleeping rooms. Audible alarm signal frequency in Group R-1, R-2 and I-1 occupancies shall be in accordance with Sections 907.5.2.1.3.1 and 907.5.2.1.3.2.

907.5.2.1.3.1 Fire alarm system audible signal. In sleeping rooms of Group R-1, R-2 and I-1 occupancies, the audible alarm signal activated by a fire alarm system shall be a 520-Hz low-frequency signal complying with NFPA 72.

907.5.2.1.3.2 Smoke alarm signal in sleeping rooms. In sleeping rooms of Group R-1, R-2 and I-1 occupancies that are required by Section 907.2.8 or 907.2.9 to have a fire alarm system, the audible alarm signal activated by single- or multiple-station smoke alarms in the dwelling unit or sleeping unit shall be a 520-Hz signal complying with NFPA 72.

Where a sleeping room smoke alarm is unable to produce a 520-Hz signal, the 520-Hz alarm signal shall be provided by a listed notification appliance or a smoke detector with an integral 520-Hz sounder.

907.5.2.1.4 Audible alarm signal. *The audible signal shall be the standard fire alarm evacuation signal, ANSI S3.41 Audible Emergency Evacuation Signal, "three pulse temporal pattern," as described in NFPA 72.*

Exception: *The use of the existing evacuation signaling scheme shall be permitted where approved by the enforcing agency.*

907.5.2.2 Emergency voice/alarm communication systems. Emergency voice/alarm communication systems required by this code shall be designed and installed in accordance with NFPA 72. The operation of any automatic fire detector, sprinkler waterflow device or manual fire alarm box shall automatically sound an alert tone followed by voice instructions giving approved information and directions for a general or staged evacuation in accordance with the building's fire safety and evacuation plans required by Section 404. In high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access*, the system shall operate on at least the alarming floor, the floor above and the floor below. Speakers shall be provided throughout the building by paging zones. At a minimum, paging zones shall be provided as follows:

1. Elevator groups.
2. Interior exit stairways.
3. Each floor.
4. Areas of refuge as defined in Chapter 2.

Exception: In Group I-2 occupancies, *where in accordance with Section 907.5.2.5, audible fire alarm notification devices are not provided, upon receipt of an alarm at a constantly attended location, a general occupant notification shall be broadcast over the public-address system.*

907.5.2.2.1 Manual override. A manual override for emergency voice communication shall be provided on a selective and all-call basis for all paging zones.

907.5.2.2.2 Live voice messages. The emergency voice/alarm communication system shall have the capability to broadcast live voice messages by paging zones on a selective and all-call basis.

907.5.2.2.3 Alternative uses. The emergency voice/alarm communication system shall be allowed to be used for other announcements, provided that the manual fire alarm use takes precedence over any other use.

907.5.2.2.4 Emergency voice/alarm communication captions. Where stadiums, arenas and grandstands have 15,000 fixed seats or more and provide audible public announcements, the emergency/voice alarm communication system shall provide prerecorded or real-time captions. Prerecorded or live emergency captions shall be from an approved location constantly attended by personnel trained to respond to an emergency.

907.5.2.2.5 Standby power. Emergency voice/alarm communications systems shall be provided with standby power in accordance with Section 1203.

907.5.2.3 Visible alarms. Visible alarm notification appliances shall be provided in accordance with Sections 907.5.2.3.1 through *907.5.2.3.4*.

Exceptions:

1. *In other than Group I-2,* Visible alarm notification appliances are not required in alterations, except where an existing fire alarm system is upgraded or replaced, or a new fire alarm system is installed.
2. Visible alarm notification appliances shall not be required in *enclosed exit stairways, enclosed exit ramps, exterior exit stairs and exterior exit ramps.*
3. Visible alarm notification appliances shall not be required in elevator cars.
4. Visual alarm notification appliances are not required in critical care areas of Group I-2 occupancies that are in compliance with Section *907.5.2.5*. ⬅
5. A visible alarm notification appliance installed in a nurses' control station or other continuously attended staff location in a Group I-2 *care* suite shall be an acceptable alternative to the installation of visible alarm notification appliances throughout the *care* suite or unit in Group I-2 occupancies that are in compliance with Section *907.5.2.5.* ⬅

907.5.2.3.1 Public use areas and common use areas. Visible alarm notification appliances shall be provided in public use areas and common use areas *including but not limited to:*

1. Band rooms.

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2. *Classrooms.*
3. *Corridors.*
4. *Gymnasiums.*
5. *Lobbies.*
6. *Meeting and conference rooms.*
7. *Multipurpose rooms.*
8. *Music practice rooms.*
9. *Occupational shops.*
10. *Occupied rooms where ambient noise impairs hearing of the fire alarm.*
11. *Sanitary facilities including restrooms, bathrooms and shower rooms.*
12. *Shared office rooms used by two or more persons.*
13. *Normally occupied room(s) used by two or more persons, such as mother's room, phone room, quiet room, wellness room, etc.*
14. *Normally occupied storage room/area.*
15. *Exam rooms in medical office buildings.*

Exception: Where employee work areas have audible alarm coverage, the notification appliance circuits serving the employee work areas shall be initially designed with not less than 20-percent spare capacity to account for the potential of adding visible notification appliances in the future to accommodate hearing-impaired employee(s).

907.5.2.3.2 Groups R-1 *and R-2.1.* Habitable spaces in dwelling units and sleeping units in Group R-1 *and R-2.1* occupancies in accordance with Table 907.5.2.3.2 shall be provided with visible alarm notification. Visible alarms shall be activated by the in-room smoke alarm and the building fire alarm system.

TABLE 907.5.2.3.2—VISIBLE ALARMS

NUMBER OF SLEEPING UNITS	SLEEPING ACCOMMODATIONS WITH VISIBLE ALARMS
6 to 25	2
26 to 50	4
51 to 75	7
76 to 100	9
101 to 150	12
151 to 200	14
201 to 300	17
301 to 400	20
401 to 500	22
501 to 1,000	5% of total
1,001 and over	50 plus 3 for each 100 over 1,000
[SFM] *Also see Chapter 11B of the California Building Code.*	

907.5.2.3.3 Group R-2. In Group R-2 occupancies required by Section 907 to have a fire alarm system, each story that contains dwelling units and sleeping units shall be provided with the capability to support future visible alarm notification appliances in accordance with *NFPA 72.* Such capability shall accommodate wired or wireless equipment.

907.5.2.3.3.1 Wired equipment. Where wired equipment is used to comply with the future capability required by Section 907.5.2.3.3, the system shall include one of the following capabilities:

1. The replacement of audible appliances with combination audible/visible appliances or additional visible notification appliances.
2. The future extension of the existing wiring from the unit smoke alarm locations to required locations for visible appliances.
3. For wired equipment, the fire alarm power supply and circuits shall have not less than 5-percent excess capacity to accommodate the future addition of visible alarm notification appliances, and a single access point to such circuits shall be available on every story. Such circuits shall not be required to be extended beyond a single access point on a story. The fire alarm system shop drawings required by Section 907.1.2 shall include the power supply and circuit documentation to accommodate the future addition of visible notification appliances.

907.5.2.3.4 Group R-2.1, R-3.1 and R-4. *Protective social care facilities which house persons who are hearing impaired, shall be provided with notification appliances for the hearing impaired installed in accordance with NFPA 72 and which shall activate upon initiation of the fire alarm system or the smoke alarms.*

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907.5.2.4 Group E schools. *One audible alarm notification appliance shall be mounted on the exterior of a building to alert occupants at each playground area.*

907.5.2.5 Group I-2. *Audible appliances shall be used in nonpatient areas. Visible appliances are allowed to be used in lieu of audible appliances in patient occupied areas. Audible appliances located in patient areas shall be only chimes or similar sounding appliances for alerting staff. Where audible fire alarm notification devices are not provided, upon receipt of an alarm at a constantly attended location, a general occupant notification shall be broadcast over the public-address system.*

In occupancies housing nonambulatory persons where restraint is practiced, staff and attendants shall be provided and housed or located in such a manner that such supervisory personnel will also be alerted upon activation of the fire alarm system or any detector required by this section.

907.6 Installation and monitoring. A fire alarm system shall be installed and monitored in accordance with Sections 907.6.1 through *907.6.6.4* and NFPA 72.

907.6.1 Wiring. Wiring shall comply with the requirements of *the California Electrical Code* and NFPA 72. Wireless protection systems utilizing radio-frequency transmitting devices shall comply with the special requirements for supervision of low-power wireless systems in NFPA 72.

907.6.1.1 High-rise buildings. *Wiring for fire alarm network communication circuits between multiple control units shall be in accordance with the following:*

1. *Class A or Class X installed in accordance with NFPA 72.*
2. *Installed in enclosed continuous metallic raceways in accordance with the California Electrical Code.*

907.6.2 Power supply. The primary and secondary power supply for the fire alarm system shall be provided in accordance with NFPA 72.

Exception: Backup power for single-station and multiple-station smoke alarms as required in Section 907.2.11.6.

907.6.3 Initiating device identification. The fire alarm system shall identify the specific initiating device address, location, device type, floor level where applicable and status including indication of normal, alarm, trouble and supervisory status, as appropriate.

Exceptions:

1. Fire alarm systems in single-story buildings less than 22,500 square feet (2090 m^2) in area.
2. Fire alarm systems that only include manual fire alarm boxes, waterflow initiating devices and not more than 10 additional alarm-initiating devices.
3. Special initiating devices that do not support individual device identification.
4. Fire alarm systems or devices that are replacing existing equipment.

907.6.3.1 Annunciation. The initiating device status shall be annunciated at an approved on-site location.

907.6.4 Zones. *Fire alarm systems shall be divided into zones where required by this section. For the purposes of annunciation and notification, zoning shall be in accordance with the following:*

1. *Where the fire-protective signaling system serves more than one building, each building shall be considered as a separate zone.*
2. *Each floor of a building shall be considered as a separate zone.*
3. *Each section of floor of a building that is separated by fire walls or by horizontal exits shall be considered as a separate zone.*
4. Each floor shall be zoned separately and a zone shall not exceed 22,500 square feet (2090 m^2). The length of any zone shall not exceed 300 feet (91 440 mm) in any direction.

   Exception: Automatic sprinkler system zones shall not exceed the area permitted by NFPA 13.
5. *For Group I-3 occupancies each cell complex shall be considered a separate zone.*
6. *For Group H and L occupancies on the 11th story and above, each side of the 2-hour fire-smoke barrier shall be considered a separate zone.*
7. *Annunciation shall be further divided into zones where deemed necessary by the enforcing agency.*

907.6.4.1 Annunciation. *Alarm, supervisory and trouble signals shall be annunciated in the main control unit by means of an audible signal and a visual display in accordance with NFPA 72. Identification of the type of alarm and supervisory initiating devices, such as manual, automatic, sprinkler waterflow, sprinkler valve supervisory, fire-pump supervisory, etc., shall be separately indicated.*

Exception: *Group R-3 occupancies.*

907.6.4.1.1 Annunciator **panel.** An *annunciator* panel *complying with 907.6.4.1* and the associated controls shall be provided in an approved *remote* location *where deemed necessary by the Enforcing Agency*. The visual zone indication shall lock in until the system is reset and shall not be canceled by the operation of an audible alarm-silencing switch.

907.6.4.2 High-rise buildings. In high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access*, a separate zone by floor shall be provided for each of the following types of alarm-initiating devices where provided:

1. Smoke detectors.

2. Sprinkler waterflow devices.
3. Manual fire alarm boxes.
4. Other approved types of automatic fire protection systems.

907.6.4.3 High-rise buildings zoning annunciator panel. *In high-rise buildings, a zoning annunciator panel shall be provided in the Fire Command Center. This panel shall not be combined with the Firefighter Smoke Control Panel unless approved. Panel shall be in matrix format or an approved equivalent configuration. All indicators shall be based upon positive confirmation. The panel shall include the following features at a minimum:*

1. *Fire alarm initiating devices with individual annunciation per floor for manual fire alarm boxes, area smoke detectors, elevator lobby smoke detectors, duct smoke detectors, heat detectors, auxiliary alarms and sprinkler waterflow. (Red LED)*
2. *Sprinkler and standpipe system control valves per floor–supervisory. (Yellow LED)*
3. *Common fire alarm system trouble. (Yellow LED)*
4. *Annunciation Panel Power On. (Green LED)*
5. *Lamp test. (Push Button)*

907.6.4.4 Notification zoning. *Upon activation of initiating devices where occupant notification is required for evacuation, all notification zones shall operate simultaneously throughout the building.*

Exceptions:

1. *High-rise buildings as permitted in Section 907.2.13.*
2. *Hospitals and convalescent facilities with staff alerting notification appliances or emergency voice/alarm communication, zoning shall be in accordance with the approved fire plan.*
3. *Detention facilities.*
4. *Upon approval by the fire code official in buildings which are sprinklered throughout, specific notification zoning shall be permitted where the notification zones are separated by a minimum of a 2-hour fire barrier and 2-hour fire-resistive floor assembly. The system shall have the capability to activate all other notification zones by automatic and manual means.*
5. *Upon approval by the fire code official in buildings which are sprinklered throughout, specific notification zoning shall be permitted where the activated initiating device or fire extinguishing system is separated from any nonactive notification zones by a minimum of 300-foot horizontal distance. The system shall have the capability to activate all other notification zones by automatic and manual means.*
6. *Where a Group H or L occupancy is located above the 10th story, each side of the 2-hour fire-smoke barrier shall be considered a separate zone.*

907.6.5 Access. Access shall be provided to each fire alarm device and notification appliance for periodic inspection, maintenance and testing.

907.6.6 Monitoring. Fire alarm systems required by this chapter or by the *California Building Code* shall be monitored by an approved supervising station in accordance with NFPA 72 *and this section.*

Exception: Monitoring by a supervising station is not required for:

1. Single- and multiple-station smoke alarms required by Section 907.2.11.
2. Smoke detectors in Group I-3 occupancies *shall be monitored in accordance with Section 907.2.6.3.*
3. Automatic sprinkler systems in one- and two-family dwellings.

907.6.6.1 Transmission of alarm signals. Transmission of alarm signals to a supervising station shall be in accordance with NFPA 72.

907.6.6.2 MIY monitoring. Direct transmission of alarms associated with monitor it yourself (MIY) transmitters to a public safety answering point (PSAP) shall not be permitted unless approved by the fire code official.

907.6.6.3 Termination of monitoring service. Termination of fire alarm monitoring services shall be in accordance with Section 901.9.

907.6.6.4 Group E schools. *Automatic fire alarm systems shall be monitored and shall transmit the alarm, supervisory and trouble signals to an approved supervising station in accordance with NFPA 72. The supervising station shall be listed as either UUFX (Central Station) or UUJS (remote & proprietary) by the Underwriters Laboratory Inc. (UL) or other approved listing and testing laboratory or shall comply with the requirements of FM 3011. Termination of monitoring services shall be in accordance with Section 907.6.6.3.*

907.7 Acceptance tests and completion. Upon completion of the installation, the fire alarm system and all fire alarm components shall be tested in accordance with NFPA 72.

907.7.1 Single- and multiple-station alarm devices. When the installation of the alarm devices is complete, each device and interconnecting wiring for multiple-station alarm devices shall be tested in accordance with the smoke alarm provisions of NFPA 72.

907.7.2 Record of completion. A record of completion in accordance with NFPA 72 verifying that the system has been installed and tested in accordance with the approved plans and specifications shall be provided.

907.7.3 Instructions. Operating, testing and maintenance instructions and record drawings ("as builts") and equipment specifications shall be provided at an approved location.

907.8 Inspection, testing and maintenance. The maintenance and testing schedules and procedures for fire alarm and fire detection systems shall be in accordance with Sections 907.8.1 through 907.8.4 and NFPA 72. Records of inspection, testing and maintenance shall be maintained.

907.8.1 Maintenance required. Where required for compliance with the provisions of this code, devices, equipment, systems, conditions, arrangements, levels of protection or other features shall thereafter be continuously maintained in accordance with applicable NFPA requirements or as directed by the fire code official.

907.8.2 Testing. Testing shall be performed in accordance with the schedules in NFPA 72 or more frequently where required by the fire code official. Records of testing shall be maintained.

Exception: Devices or equipment that are inaccessible because of safety considerations shall be tested during scheduled shutdowns where approved by the fire code official, but not less than every 18 months.

907.8.3 Smoke detector sensitivity. Smoke detector sensitivity shall be checked within one year after installation and every alternate year thereafter. After the second calibration test, where sensitivity tests indicate that the detector has remained within its listed and marked sensitivity range (or 4-percent obscuration light gray smoke, if not marked), the length of time between calibration tests shall be permitted to be extended to not more than 5 years. Where the frequency is extended, records of detector-caused nuisance alarms and subsequent trends of these alarms shall be maintained. In zones or areas where nuisance alarms show any increase over the previous year, calibration tests shall be performed.

907.8.4 Inspection, testing and maintenance. The building owner shall be responsible to maintain the fire and life safety systems in an operable condition at all times. Service personnel shall meet the qualification requirements of NFPA 72 for inspection, testing and maintenance of such systems. Records of inspection, testing and maintenance shall be maintained.

907.9 Where required in existing buildings and structures. An approved fire alarm system shall be provided in existing buildings and structures where required in Chapter 11.

907.10 Smoke alarm maintenance. Smoke alarms shall be tested and maintained in accordance with the manufacturer's instructions and this code.

907.10.1 Smoke alarm replacement. Smoke alarms shall be replaced when any of the following apply:

1. The smoke alarm fails to respond to operability tests.
2. The smoke alarm exceeds 10 years from the date of manufacture marked on the unit, unless an earlier replacement is specified in the manufacturer's instructions.
3. The smoke alarm end-of-life signal is sounded.
4. The smoke alarm date of manufacture cannot be determined.

Where the replacement of smoke alarms is required by this section, smoke alarms shall not be required to include the 520-Hz signal unless the smoke alarms to be replaced include that signal.

SECTION 908—EMERGENCY ALARM SYSTEMS

908.1 Group H occupancies. Emergency alarms for the detection and notification of an emergency condition in Group H occupancies shall be provided as required in Chapter 50.

908.2 Group H-5 occupancy. Emergency alarms for notification of an emergency condition in an HPM facility shall be provided as required in Section 2703.12.

908.3 Fire alarm system interface. Where an emergency alarm system is interfaced with a building's fire alarm system, the signal produced at the fire alarm control unit shall be a supervisory signal.

908.4 Carbon dioxide enrichment systems. *A gas detection system shall be provided in rooms and indoor areas in which carbon dioxide enrichment processes are located in accordance with Section 5307.3.2.*

SECTION 909—SMOKE CONTROL SYSTEMS

909.1 Scope and purpose. This section applies to mechanical or passive smoke control systems where they are required for new buildings or portions thereof by provisions of the *California Building Code* or this code. The purpose of this section is to establish minimum requirements for the design, installation and acceptance testing of smoke control systems that are intended to provide a tenable environment for the evacuation or relocation of occupants. These provisions are not intended for the preservation of contents, the timely restoration of operations or for assistance in fire suppression or overhaul activities. Smoke control systems regulated by this section serve a different purpose than the smoke- and heat-removal provisions found in Section 910. Mechanical smoke control systems shall not be considered exhaust systems under Chapter 5 of the *California Mechanical Code*.

909.2 General design requirements. Buildings, structures, or parts thereof required by the *California Building Code* or this code to have a smoke control system or systems shall have such systems designed in accordance with the applicable requirements of Section 909 and the generally accepted and well-established principles of engineering relevant to the design. The construction documents shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.

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909.3 Special inspection and test requirements. In addition to the ordinary inspection and test requirements that buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo special inspections and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the construction documents shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms as in Section 1704 of the *California Building Code*.

909.4 Analysis. A rational analysis supporting the types of smoke control systems to be employed, the methods of their operations, the systems supporting them and the methods of construction to be utilized shall accompany the construction documents submission and include, but not be limited to, the items indicated in Sections 909.4.1 through 909.4.7.

909.4.1 Stack effect. The system shall be designed such that the maximum probable normal or reverse stack effect will not adversely interfere with the system's capabilities. In determining the maximum probable stack effect, altitude, elevation, weather history and interior temperatures shall be used.

909.4.2 Temperature effect of fire. Buoyancy and expansion caused by the design fire in accordance with Section 909.9 shall be analyzed. The system shall be designed such that these effects do not adversely interfere with the system's capabilities.

909.4.3 Wind effect. The design shall consider the adverse effects of wind. Such consideration shall be consistent with the wind-loading provisions of the *California Building Code*.

909.4.4 Systems. The design shall consider the effects of the heating, ventilating and air-conditioning (HVAC) systems on both smoke and fire transport. The analysis shall include all permutations of systems status. The design shall consider the effects of the fire on the heating, ventilating and air-conditioning systems.

909.4.5 Climate. The design shall consider the effects of low temperatures on systems, property and occupants. Air inlets and exhausts shall be located so as to prevent snow or ice blockage.

909.4.6 Duration of operation. All portions of active or engineered smoke control systems shall be capable of continued operation after detection of the fire event for a period of not less than either 20 minutes or 1.5 times the calculated egress time, whichever is greater.

909.4.7 Smoke control system interaction. The design shall consider the interaction effects of the operation of multiple smoke control systems for all design scenarios.

909.5 Smoke barrier construction. Smoke barriers required for passive smoke control and a smoke control system using the pressurization method shall comply with Section 709 of the *California Building Code*. The maximum allowable leakage area shall be the aggregate area calculated using the following leakage area ratios:

1. Walls: $A/A_w = 0.00100$
2. Interior exit stairways and ramps and exit passageways: $A/A_w = 0.00035$
3. Enclosed exit access stairways and ramps and all other shafts: $A/A_w = 0.00150$
4. Floors and roofs: $A/A_F = 0.00050$

where:

A = Total leakage area, square feet (m^2).

A_F = Unit floor or roof area of barrier, square feet (m^2).

A_w = Unit wall area of barrier, square feet (m^2).

The leakage area ratios shown do not include openings due to gaps around doors and operable windows. The total leakage area of the smoke barrier shall be determined in accordance with Section 909.5.1 and tested in accordance with Section 909.5.2.

909.5.1 Total leakage area. Total leakage area of the barrier is the product of the smoke barrier gross area multiplied by the allowable leakage area ratio, plus the area of other openings such as gaps around doors and operable windows.

909.5.2 Testing of leakage area. Compliance with the maximum total leakage area shall be determined by achieving the minimum air pressure difference across the barrier with the system in the smoke control mode for mechanical smoke control systems utilizing the pressurization method. Compliance with the maximum total leakage area of passive smoke control systems shall be verified through methods such as door fan testing or other methods, as approved by the fire code official.

909.5.3 Opening protection. Openings in smoke barriers shall be protected by automatic-closing devices actuated by the required controls for the mechanical smoke control system. Door openings shall be protected by fire door assemblies complying with Section 716 of the *California Building Code*.

Exceptions:

1. Passive smoke control systems with automatic-closing devices actuated by spot-type smoke detectors listed for releasing service installed in accordance with Section 907.3. *When used in a Group I-2, such detectors shall activate the fire alarm system and shall close all the smoke barrier doors within the effected zone.*
2. Fixed openings between smoke zones that are protected utilizing the airflow method *in other than Group I-2.*
3. In Group I-2, *R-2.1* and ambulatory care facilities, where a pair of opposite-swinging doors are installed across a corridor in accordance with Section 909.5.3.1, the doors shall not be required to be protected in accordance with Section 716 of

the *California Building Code*. The doors shall be close-fitting within operational tolerances and shall not have a center mullion. *Positive-latching devices are required. Doors installed across corridors shall comply with Section 1010.1.1.*

4. In Group I-2, *R-2.1* and ambulatory care facilities, where such doors are special-purpose horizontal sliding, accordion or folding door assemblies installed in accordance with Section 1010.3.3 and are automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *California Building Code they shall be protected in accordance with Section 716 of the California Building Code. Doors installed across corridors shall comply with Section 1010.1.1.*
5. Group I-3.
6. Openings between smoke zones with clear ceiling heights of 14 feet (4267 mm) or greater and bank-down capacity of greater than 20 minutes as determined by the design fire size.
7. *In Group I-2, smoke damper activation may be accomplished by a fire alarm control unit provided that an open area smoke detection system is provided within all areas served by an HVAC system.*

909.5.3.1 Group I-2, *R-2.1* and ambulatory care facilities. In Group I-2, *R-2.1* and ambulatory care facilities, where doors are installed across a corridor, the doors shall be automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *California Building Code* and shall have a vision panel with fire-protection-rated glazing materials in fire-protection-rated frames, the area of which shall not exceed that tested. *In Group I-2, where swinging doors are installed across a corridor, such doors shall be opposite swinging pairs.*

909.5.3.2 Ducts and air transfer openings. Ducts and air transfer openings are required to be protected with a minimum Class II, 250°F (121°C) smoke damper complying with Section 717 of the *California Building Code*.

909.6 Pressurization method. The primary mechanical means of controlling smoke shall be by pressure differences across smoke barriers. Maintenance of a tenable environment is not required in the smoke-control zone of fire origin.

909.6.1 Minimum pressure difference. The pressure difference across a smoke barrier used to separate smoke zones shall be not less than 0.05-inch water gage (0.0124 kPa) in buildings equipped throughout with automatic sprinkler systems.

In buildings permitted to be not equipped throughout with automatic sprinkler systems, the smoke control system shall be designed to achieve pressure differences not less than two times the maximum calculated pressure difference produced by the design fire.

909.6.2 Maximum pressure difference. The maximum air pressure difference across a smoke barrier shall be determined by required door-opening or closing forces. The actual force required to open exit doors when the system is in the smoke control mode shall be in accordance with Section 1010.1.3. Opening and closing forces for other doors shall be determined by standard engineering methods for the resolution of forces and reactions. The calculated force to set a side-hinged, swinging door in motion shall be determined by:

Equation 9-1 $F = F_{dc} + K(WA\Delta P)/2(W - d)$

where:

A = Door area, square feet (m^2).

d = Distance from door handle to latch edge of door, feet (m).

F = Total door opening force, pounds (N).

F_{dc} = Force required to overcome closing device, pounds (N).

K = Coefficient 5.2 (1.0).

W = Door width, feet (m).

ΔP = Design pressure difference, inches of water (Pa).

909.6.3 Pressurized stairways and elevator hoistways. Where stairways or elevator hoistways are pressurized, such pressurization systems shall comply with Section 909 as smoke control systems, in addition to the requirements of Sections 909.20 and 909.21.

909.7 Airflow design method. Where approved by the fire code official, smoke migration through openings fixed in a permanently open position, which are located between smoke control zones by the use of the airflow method, shall be permitted. The design airflow shall be in accordance with this section. Airflow shall be directed to limit smoke migration from the fire zone. The geometry of openings shall be considered to prevent flow reversal from turbulent effects. Smoke control systems using the airflow method shall be designed in accordance with NFPA 92.

909.7.1 Prohibited conditions. This method shall not be employed where either the quantity of air or the velocity of the airflow will adversely affect other portions of the smoke control system, unduly intensify the fire, disrupt plume dynamics or interfere with exiting. Airflow toward the fire shall not exceed 200 feet per minute (1.02 m/s). Where the calculated airflow exceeds this limit, the airflow method shall not be used.

909.8 Exhaust method. Where approved by the fire code official, mechanical smoke control for large enclosed volumes, such as in atriums or malls, shall be permitted to utilize the exhaust method. Smoke control systems using the exhaust method shall be designed in accordance with NFPA 92.

909.8.1 Smoke layer. The height of the lowest horizontal surface of the smoke layer interface shall be maintained not less than 6 feet (1829 mm) above a walking surface that forms a portion of a required egress system within the smoke zone.

909.9 Design fire. The design fire shall be based on a rational analysis performed by the registered design professional and approved by the fire code official. The design fire shall be based on the analysis in accordance with Section 909.4 and this section.

909.9.1 Factors considered. The engineering analysis shall include the characteristics of the fuel, fuel load, effects included by the fire and whether the fire is likely to be steady or unsteady.

909.9.2 Design fire fuel. Determination of the design fire shall include consideration of the type of fuel, fuel spacing and configuration.

909.9.3 Heat-release assumptions. The analysis shall make use of best available data from approved sources and shall not be based on excessively stringent limitations of combustible material.

909.9.4 Sprinkler effectiveness assumptions. A documented engineering analysis shall be provided for conditions that assume fire growth is halted at the time of sprinkler activation.

909.10 Equipment. Equipment including, but not limited to, fans, ducts, automatic dampers and balance dampers shall be suitable for their intended use, suitable for the probable exposure temperatures that the rational analysis indicates, and as approved by the fire code official.

909.10.1 Exhaust fans. Components of exhaust fans shall be rated and certified by the manufacturer for the probable temperature rise to which the components will be exposed. This temperature rise shall be computed by:

Equation 9-2 $T_s = (Q_c/mc) + (T_a)$

where:

c = Specific heat of smoke at smoke layer temperature, Btu/lb°F (kJ/kg × K).

m = Exhaust rate, pounds per second (kg/s).

Q_c = Convective heat output of fire, Btu/s (kW).

T_a = Ambient temperature, °F (K).

T_s = Smoke temperature, °F (K).

Exception: Reduced T_s as calculated based on the assurance of adequate dilution air.

909.10.2 Ducts. Duct materials and joints shall be capable of withstanding the probable temperatures and pressures to which they are exposed as determined in accordance with Section 909.10.1. Ducts shall be constructed and supported in accordance with the *California Mechanical Code*. Ducts shall be leak tested to 1.5 times the maximum design pressure in accordance with nationally accepted practices. Measured leakage shall not exceed 5 percent of design flow. Results of such testing shall be a part of the documentation procedure. Ducts shall be supported directly from fire-resistance-rated structural elements of the building by substantial, noncombustible supports.

Exception: Flexible connections, for the purpose of vibration isolation, complying with the *California Mechanical Code* and that are constructed of approved fire-resistance-rated materials.

909.10.3 Equipment, inlets and outlets. Equipment shall be located so as to not expose uninvolved portions of the building to an additional fire hazard. Outside air inlets shall be located so as to minimize the potential for introducing smoke or flame into the building. Exhaust outlets shall be so located as to minimize reintroduction of smoke into the building and to limit exposure of the building or adjacent buildings to an additional fire hazard.

909.10.4 Automatic dampers. Automatic dampers, regardless of the purpose for which they are installed within the smoke control system, shall be listed and conform to the requirements of approved recognized standards.

909.10.5 Fans. In addition to other requirements, belt-driven fans shall have 1.5 times the number of belts required for the design duty with the minimum number of belts being two. Fans shall be selected for stable performance based on normal temperature and, where applicable, elevated temperature. Calculations and manufacturer's fan curves shall be part of the documentation procedures. Fans shall be supported and restrained by noncombustible devices in accordance with the structural design requirements of Chapter 16 of the *California Building Code*.

Motors driving fans shall not be operated beyond their nameplate horsepower (kilowatts) as determined from measurement of actual current draw and shall have a minimum service factor of 1.15.

909.11 Standby power. Smoke control systems shall be provided with standby power in accordance with Section 1203.

909.11.1 Equipment room. The standby power source and its transfer switches shall be in a room separate from the normal power transformers and switch gears and ventilated directly to and from the exterior. The room shall be enclosed with not less than 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

909.11.2 Power sources and power surges. Elements of the smoke control system relying on volatile memories or the like shall be supplied with uninterruptable power sources of sufficient duration to span 15-minute primary power interruption. Elements of the smoke control system susceptible to power surges shall be suitably protected by conditioners, suppressors or other approved means.

909.12 Detection and control systems. Fire detection systems providing control input or output signals to mechanical smoke control systems or elements thereof shall comply with the requirements of Section 907. Such systems shall be equipped with a control unit complying with UL 864 and listed as smoke control equipment.

909.12.1 Verification. Control systems for mechanical smoke control systems shall include provisions for verification. Verification shall include positive confirmation of actuation, testing, manual override and the presence of power downstream of all disconnects. A preprogrammed weekly test sequence shall report abnormal conditions audibly, visually and by printed report. The preprogrammed weekly test shall operate all devices, equipment and components used for smoke control.

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Exception: Where verification of individual components tested through the preprogrammed weekly testing sequence will interfere with, and produce unwanted effects to, normal building operation, such individual components are permitted to be bypassed from the preprogrammed weekly testing, where approved by the fire code official and in accordance with both of the following:

1. Where the operation of components is bypassed from the preprogrammed weekly test, presence of power downstream of all disconnects shall be verified weekly by a listed control unit.
2. Testing of all components bypassed from the preprogrammed weekly test shall be in accordance with Section 909.22.6.

The status of dampers shall be determined using limit or proximity switches installed at the damper or incorporated into the damper actuator. Where multiple dampers are grouped together in an assembly requiring one or more actuators, each damper shall be independently controlled by a separate actuator and provided with an individual limit or proximity switch, or the dampers shall be linked together by a reliable and durable mechanical means or otherwise by permanent means into one or more groups, with each group provided with a common limit or proximity switch.

The status of fans shall be determined by sensing the airflow downstream of the fans using pressure differential switches or transmitters, or by other means of positive proof of airflow where approved by the enforcing authority.

909.12.2 Wiring. In addition to meeting requirements of *the California Electrical Code*, all wiring, regardless of voltage, shall be fully enclosed within continuous raceways.

909.12.3 Activation. Smoke control systems shall be activated in accordance with this section.

909.12.3.1 Pressurization, airflow or exhaust method. Mechanical smoke control systems using the pressurization, airflow or exhaust method shall have completely automatic control.

909.12.3.2 Passive method. Passive smoke control systems actuated by approved spot-type detectors listed for releasing service shall be permitted.

909.12.4 Automatic control. Where completely automatic control is required or used, the automatic-control sequences shall be initiated from an appropriately zoned automatic sprinkler system complying with Section 903.3.1.1, manual controls provided with ready access for the fire department and any smoke detectors required by the engineering analysis.

909.13 Control air tubing. Control air tubing shall be of sufficient size to meet the required response times. Tubing shall be flushed clean and dry prior to final connections and shall be adequately supported and protected from damage. Tubing passing through concrete or masonry shall be sleeved and protected from abrasion and electrolytic action.

909.13.1 Materials. Control air tubing shall be hard drawn copper, Type L, ACR in accordance with ASTM B42, ASTM B43, ASTM B68/B68M, ASTM B88, ASTM B251 and ASTM B280. Fittings shall be wrought copper or brass, solder type, in accordance with ASME B16.18 or ASME B16.22. Changes in direction shall be made with appropriate tool bends. Brass compression-type fittings shall be used at final connection to devices; other joints shall be brazed using a BCuP5 brazing alloy with solidus above 1,100°F (593°C) and liquidus below 1,500°F (816°C). Brazing flux shall be used on copper-to-brass joints only.

Exception: Nonmetallic tubing used within control panels and at the final connection to devices, provided that all of the following conditions are met:

1. Tubing shall comply with the requirements of Section 602.3.5 of the *California Mechanical Code*.
2. Tubing and the connected device shall be completely enclosed within a galvanized or paint-grade steel enclosure having a minimum thickness of 0.0296 inch (0.7534 mm) (No. 22 gage). Entry to the enclosure shall be by copper tubing with a protective grommet of neoprene or Teflon or by suitable brass compression to male-barbed adapter.
3. Tubing shall be identified by appropriately documented coding.
4. Tubing shall be neatly tied and supported within the enclosure. Tubing bridging cabinets and doors or moveable devices shall be of sufficient length to avoid tension and excessive stress. Tubing shall be protected against abrasion. Tubing connected to devices on doors shall be fastened along hinges.

909.13.2 Isolation from other functions. Control tubing serving other than smoke control functions shall be isolated by automatic isolation valves or shall be an independent system.

909.13.3 Testing. Control air tubing shall be tested at three times the operating pressure for not less than 30 minutes without any noticeable loss in gauge pressure prior to final connection to devices.

909.14 Marking and identification. The detection and control systems shall be clearly marked at all junctions, accesses and terminations.

909.15 Control diagrams. Identical control diagrams showing all devices in the system and identifying their location and function shall be maintained current and kept on file with the fire code official, the fire department and in the fire command center in a format and manner approved by the fire code official.

909.16 Firefighter's smoke control panel. A firefighter's smoke control panel for fire department emergency response purposes only shall be provided and shall include manual control or override of automatic control for mechanical smoke control systems. The panel shall be located in a fire command center complying with Section 508 in high-rise buildings, *Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* or buildings with smoke-protected assembly seating. In all other buildings, the firefighter's smoke control panel shall be installed in an approved location adjacent to the fire alarm control panel. The firefighter's smoke control panel shall comply with Sections 909.16.1 through 909.16.3.

909.16.1 Smoke control systems. Fans within the building shall be shown on the firefighter's control panel. A clear indication of the direction of airflow and the relationship of components shall be displayed. Status indicators shall be provided for all smoke control equipment, annunciated by fan and zone and by pilot-lamp-type indicators as follows:

1. Fans, dampers and other operating equipment in their normal status—WHITE.
2. Fans, dampers and other operating equipment in their off or closed status—RED.
3. Fans, dampers and other operating equipment in their on or open status—GREEN.
4. Fans, dampers and other operating equipment in a fault status—YELLOW/AMBER.

909.16.2 Smoke control panel. The firefighter's control panel shall provide control capability over the complete smoke control system equipment within the building as follows:

1. ON-AUTO-OFF control over each individual piece of operating smoke control equipment that can be controlled from other sources within the building. This includes stairway pressurization fans; smoke exhaust fans; supply, return and exhaust fans; elevator shaft fans; and other operating equipment used or intended for smoke control purposes.
2. OPEN-AUTO-CLOSE control over individual dampers relating to smoke control and that are controlled from other sources within the building.
3. ON-OFF or OPEN-CLOSE control over smoke control and other critical equipment associated with a fire or smoke emergency and that can only be controlled from the firefighter's control panel.

Exceptions:

1. Complex systems, where approved, where the controls and indicators are combined to control and indicate all elements of a single smoke zone as a unit.
2. Complex systems, where approved, where the control is accomplished by computer interface using approved, plain English commands.

909.16.3 Control action and priorities. The firefighter's control panel actions shall be as follows:

1. ON-OFF and OPEN-CLOSE control actions shall have the highest priority of any control point within the building. Once issued from the firefighter's control panel, automatic or manual control from any other control point within the building shall not contradict the control action. Where automatic means are provided to interrupt normal, nonemergency equipment operation or produce a specific result to safeguard the building or equipment including, but not limited to, duct freezestats, duct smoke detectors, high-temperature cutouts, temperature-actuated linkage and similar devices, such means shall be capable of being overridden by the firefighter's control panel. The last control action as indicated by each firefighter's control panel switch position shall prevail. Control actions shall not require the smoke control system to assume more than one configuration at any one time.

   Exception: Power disconnects required by *the California Electrical Code*.
2. Only the AUTO position of each three-position firefighter's control panel switch shall allow automatic or manual control action from other control points within the building. The AUTO position shall be the NORMAL, nonemergency, building control position. Where a firefighter's control panel is in the AUTO position, the actual status of the device (on, off, open, closed) shall continue to be indicated by the status indicator described in Section 909.16.1. Where directed by an automatic signal to assume an emergency condition, the NORMAL position shall become the emergency condition for that device or group of devices within the zone. Control actions shall not require the smoke control system to assume more than one configuration at any one time.

909.17 System response time. Smoke-control system activation shall be initiated immediately after receipt of an appropriate automatic or manual activation command. Smoke control systems shall activate individual components (such as dampers and fans) in the sequence necessary to prevent physical damage to the fans, dampers, ducts and other equipment. For purposes of smoke control, the firefighter's control panel response time shall be the same for automatic or manual smoke control action initiated from any other building control point. The total response time, including that necessary for detection, shutdown of operating equipment and smoke control system startup, shall allow for full operational mode to be achieved before the conditions in the space exceed the design smoke condition. Upon receipt of an alarm condition at the fire alarm control panel, fans, dampers and automatic doors shall have achieved their proper operating state and the final status shall be indicated at the smoke control panel within 90 seconds. The system response time for each component and their sequential relationships shall be detailed in the required rational analysis and verification of their installed condition reported in the required final report.

909.18 Acceptance testing. Devices, equipment, components and sequences shall be individually tested. These tests, in addition to those required by other provisions of this code, shall consist of determination of function, sequence and, where applicable, capacity of their installed condition.

909.18.1 Detection devices. Smoke or fire detectors that are a part of a smoke control system shall be tested in accordance with Chapter 9 in their installed condition. Where applicable, this testing shall include verification of airflow in both minimum and maximum conditions.

909.18.2 Ducts. Ducts that are part of a smoke control system shall be traversed using generally accepted practices to determine actual air quantities.

909.18.3 Dampers. Dampers shall be tested for function in their installed condition in accordance with NFPA 80 and NFPA 105.

909.18.4 Inlets and outlets. Inlets and outlets shall be read using generally accepted practices to determine air quantities.

909.18.5 Fans. Fans shall be examined for correct rotation. Measurements of voltage, amperage, revolutions per minute and belt tension shall be made.

909.18.6 Smoke barriers. Measurements using inclined manometers or other approved calibrated measuring devices shall be made of the pressure differences across smoke barriers. Such measurements shall be conducted for each possible smoke control condition.

909.18.7 Controls. Each smoke zone equipped with an automatic-initiation device shall be put into operation by the actuation of one such device. Each additional device within the zone shall be verified to cause the same sequence without requiring the operation of fan motors in order to prevent damage. Control sequences shall be verified throughout the system, including verification of override from the firefighter's control panel and simulation of standby power conditions.

909.18.8 Testing for smoke control. Smoke control systems shall be tested by a special inspector in accordance with Section 1705.19 of the *California Building Code*.

909.18.8.1 Scope of testing. Testing shall be conducted in accordance with the following:

1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
2. Prior to occupancy and after sufficient completion for the purposes of pressure-difference testing, flow measurements, and detection and control verification.

909.18.8.2 Qualifications. Approved agencies for smoke control testing shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

909.18.8.3 Reports. A complete report of testing shall be prepared by the approved agency. The report shall include identification of all devices by manufacturer, nameplate data, design values, measured values and identification tag or mark. The report shall be reviewed by the responsible registered design professional and, when satisfied that the design intent has been achieved, the responsible registered design professional shall sign, seal and date the report.

909.18.8.3.1 Report filing. A copy of the final report shall be filed with the fire code official and an identical copy shall be maintained in an approved location at the building.

909.18.9 Identification and documentation. Charts, drawings and other documents identifying and locating each component of the smoke control system, and describing their proper function and maintenance requirements, shall be maintained on file at the building as an attachment to the report required by Section 909.18.8.3. Devices shall have an approved identifying tag or mark on them consistent with the other required documentation and shall be dated indicating the last time they were successfully tested and by whom.

An approved operations manual describing the complete operations of the smoke control system and functioning of the firefighter's smoke control panel shall be maintained at the fire command center.

909.19 System acceptance. Buildings, or portions thereof, required by this code to comply with this section shall not be issued a certificate of occupancy until such time that the fire code official determines that the provisions of this section have been fully complied with and that the fire department has received satisfactory instruction on the operation, both automatic and manual, of the system and a written maintenance program complying with the requirements of Section 909.22.1 has been submitted and approved by the fire code official.

Exception: In buildings of phased construction, a temporary certificate of occupancy, as approved by the fire code official, shall be allowed, provided that those portions of the building to be occupied meet the requirements of this section and that the remainder does not pose a significant hazard to the safety of the proposed occupants or adjacent buildings.

[BF] 909.20 Smokeproof enclosures. Where required by Section 1023.12, a smokeproof enclosure shall be constructed in accordance with this section. A smokeproof enclosure shall consist of an interior exit stairway or ramp that is enclosed in accordance with the applicable provisions of Section 1023 and an open exterior balcony meeting the requirements of this section. Where access to the roof is required, such access shall be from the smokeproof enclosure where a smokeproof enclosure is required.

[BF] 909.20.1 Access. Access to the stairway or ramp shall be by way of a vestibule or an open exterior balcony. The minimum dimension of the vestibule shall be not less than the required clear width of the corridor leading to the vestibule but shall not have a width of less than 44 inches (1118 mm) and shall not have a length of less than 72 inches (1829 mm) in the direction of egress travel into the stairway, measured in a straight line between the centerline of the doorways into the vestibule and stairway.

[BF] 909.20.2 Construction. The smokeproof enclosure shall be separated from the remainder of the building by not less than 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both. Openings are not permitted other than the required means of egress doors. The vestibule shall be separated from the stairway or ramp by not less than 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both. The open exterior balcony shall be constructed in accordance with the fire-resistance-rating requirements for floor assemblies.

[BF] 909.20.2.1 Door closers. Doors in a smokeproof enclosure shall be self-closing or automatic closing by actuation of a smoke detector in accordance with Section 716.2.6.6 of the *California Building Code* and shall be installed at the floor-side entrance to the smokeproof enclosure. The actuation of the smoke detector on any door shall activate the closing devices on all doors in the smokeproof enclosure at all levels. Smoke detectors shall be installed in accordance with Section 907.3.

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[BF] 909.20.3 Natural ventilation alternative. The provisions of Sections 909.20.3.1 through 909.20.3.3 shall apply to ventilation of smokeproof enclosures by natural means.

[BF] 909.20.3.1 Balcony doors. Where access to the stairway or ramp is by way of an open exterior balcony, the door assembly into the enclosure shall be a fire door assembly in accordance with Section 716 of the *California Building Code*.

[BF] 909.20.3.2 Vestibule doors. Where access to the stairway or ramp is by way of a vestibule, the door assembly into the vestibule shall be a fire door assembly complying with Section 716 of the *California Building Code*. The door assembly from the vestibule to the stairway shall have not less than a 20-minute fire protection rating complying with Section 716 of the *California Building Code*.

[BF] 909.20.3.3 Vestibule ventilation. Each vestibule shall have a minimum net area of 16 square feet (1.5 m^2) of opening in a wall facing an outer court, yard or public way that is not less than 20 feet (6096 mm) in width.

➡ **[BF] 909.20.4 Stairway and ramp pressurization alternative.** Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the vestibule is not required, provided that each interiorexit stairway or ramp is pressurized to not less than 0.10 inch of water (25 Pa) and not more than 0.35 inch of water (87 Pa) in the shaft relative to the building measured with all interior exit stairway and ramp doors closed under maximum anticipated conditions of stack effect and wind effect.

[BF] 909.20.5 Ventilating equipment. The activation of ventilating equipment required by the alternative in Section 909.20.4 shall be by smoke detectors installed at each floor level at an approved location at the entrance to the smokeproof enclosure. When the closing device for the stairway and ramp shaft and vestibule doors is activated by smoke detection or power failure, the mechanical equipment shall activate and operate at the required performance levels. Smoke detectors shall be installed in accordance with Section 907.3.

[BF] 909.20.5.1 Ventilation systems. Smokeproof enclosure ventilation systems shall be independent of other building ventilation systems. The equipment, control wiring, power wiring and ductwork shall comply with one of the following:

1. Equipment, control wiring, power wiring and ductwork shall be located exterior to the building and directly connected to the smokeproof enclosure or connected to the smokeproof enclosure by ductwork enclosed by not less than 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.
2. Equipment, control wiring, power wiring and ductwork shall be located within the smokeproof enclosure with intake or exhaust directly from and to the outside or through ductwork enclosed by not less than 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.
3. Equipment, control wiring, power wiring and ductwork shall be located within the building if separated from the remainder of the building, including other mechanical equipment, by not less than 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

Exception: Control wiring and power wiring located outside of a 2-hour fire barrier construction shall be protected using any one of the following methods:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 2 hours.
2. Where encased with not less than 2 inches (51 mm) of concrete.
3. Electrical circuit protective systems shall have a fire-resistance rating of not less than 2 hours. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

[BF] 909.20.5.2 Standby power. Mechanical vestibule and stairway and ramp shaft ventilation systems and automatic fire detection systems shall be provided with standby power in accordance with Section 1203.

[BF] 909.20.5.3 Acceptance and testing. Before the mechanical equipment is approved, the system shall be tested in the presence of the building official to confirm that the system is operating in compliance with these requirements.

[BF] 909.21 Elevator hoistway pressurization alternative. Where elevator hoistway pressurization is provided in lieu of required enclosed elevator lobbies, the pressurization system shall comply with Sections 909.21.1 through 909.21.11. The design shall consider the interaction effects of the operation of multiple smoke control systems for all design scenarios in accordance with Section 909.4.7. All components or systems associated with the means of mitigating adverse interaction shall comply with the applicable subsections of Section 909.

[BF] 909.21.1 Pressurization requirements. Elevator hoistways shall be pressurized to maintain a minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to adjacent occupied space on all floors. This pressure shall be measured at the midpoint of each hoistway door, with all elevator cars at the floor of recall and all hoistway doors on the floor of recall open and all other hoistway doors closed. The pressure differentials shall be measured between the hoistway and the adjacent elevator landing. The opening and closing of hoistway doors at each level must be demonstrated during this test. The supply air intake shall be from an outside, uncontaminated source located a minimum distance of 20 feet (6096 mm) from any air exhaust system or outlet.

Exceptions:

1. On floors containing only Group R occupancies, the pressure differential is permitted to be measured between the hoistway and a dwelling unit or sleeping unit.

2. Where an elevator opens into a lobby enclosed in accordance with Section 3007.6 or 3008.6 of the *California Building Code*, the pressure differential is permitted to be measured between the hoistway and the space immediately outside the door(s) from the floor to the enclosed lobby.
3. The pressure differential is permitted to be measured relative to the outdoor atmosphere on floors other than the following:
    3.1. The fire floor.
    3.2. The two floors immediately below the fire floor.
    3.3. The floor immediately above the fire floor.
4. The minimum positive pressure of 0.10 inch of water (25 Pa) and a maximum positive pressure of 0.25 inch of water (67 Pa) with respect to occupied floors is not required at the floor of recall with the doors open.

[BF] 909.21.1.1 Use of ventilation systems. Ventilation systems, other than hoistway supply air systems, are permitted to be used to exhaust air from adjacent spaces on the fire floor, two floors immediately below and one floor immediately above the fire floor to the building's exterior where necessary to maintain positive pressure relationships as required in Section 909.21.1 during operation of the elevator shaft pressurization system.

[BF] 909.21.2 Rational analysis. A rational analysis complying with Section 909.4 shall be submitted with the construction documents.

[BF] 909.21.3 Ducts for system. Any duct system that is part of the pressurization system shall be protected with the same fire-resistance rating as required for the elevator shaft enclosure.

[BF] 909.21.4 Fan system. The fan system provided for the pressurization system shall be as required by Sections 909.21.4.1 through 909.21.4.4.

[BF] 909.21.4.1 Fire resistance. Where located within the building, the fan system that provides the pressurization shall be protected with the same fire-resistance rating required for the elevator shaft enclosure.

[BF] 909.21.4.2 Smoke detection. The fan system shall be equipped with a smoke detector that will automatically shut down the fan system when smoke is detected within the system.

[BF] 909.21.4.3 Separate systems. A separate fan system shall be used for each elevator hoistway.

[BF] 909.21.4.4 Fan capacity. The supply fan shall be either adjustable with a capacity of not less than 1,000 cfm (0.4719 m^3/s) per door, or that specified by a registered design professional to meet the requirements of a designed pressurization system.

[BF] 909.21.5 Standby power. The pressurization system shall be provided with standby power in accordance with Section 1203.

[BF] 909.21.6 Activation of pressurization system. The elevator pressurization system shall be activated upon activation of the elevator lobby smoke detectors.

[BF] 909.21.7 Testing. Testing for performance shall be required in accordance with Section 909.18.8. System acceptance shall be in accordance with Section 909.19.

[BF] 909.21.8 Marking and identification. Detection and control systems shall be marked in accordance with Section 909.14.

[BF] 909.21.9 Control diagrams. Control diagrams shall be provided in accordance with Section 909.15.

[BF] 909.21.10 Control panel. A control panel complying with Section 909.16 shall be provided.

[BF] 909.21.11 System response time. Hoistway pressurization systems shall comply with the requirements for smoke control system response time in Section 909.17.

909.22 Maintenance. Smoke control systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The system shall be maintained in accordance with the manufacturer's instructions and Sections 909.22.1 through 909.22.6.

909.22.1 Schedule. A routine maintenance and operational testing program shall be initiated immediately after the smoke control system has passed the acceptance tests. A written schedule for routine maintenance and operational testing shall be established.

909.22.2 Records. Records of smoke control system testing and maintenance shall be maintained. The record shall include the date of the maintenance, identification of the servicing personnel and notification of any unsatisfactory condition and the corrective action taken, including parts replaced.

909.22.3 Testing. Operational testing of the smoke control system shall include all equipment such as initiating devices, fans, dampers, controls, doors and windows.

909.22.4 Dedicated smoke control systems. Dedicated smoke control systems shall be operated for each control sequence semiannually. The system shall be tested under standby power conditions.

909.22.5 Nondedicated smoke control systems. Nondedicated smoke control systems shall be operated for each control sequence annually. The system shall be tested under standby power conditions.

909.22.6 Components bypassing weekly test. Where components of the smoke control system are bypassed by the preprogrammed weekly test required by Section 909.12.1, such components shall be tested semiannually. The system shall be tested under standby power conditions.

SECTION 910—SMOKE AND HEAT REMOVAL

910.1 General. Where required by this code, smoke and heat vents or mechanical smoke removal systems shall conform to the requirements of this section.

910.2 Where required. Smoke and heat vents or a mechanical smoke removal system shall be installed as required by Sections 910.2.1 and 910.2.2.

Exceptions:

1. Frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.
2. Smoke and heat removal shall not be required in areas of buildings equipped with early suppression fast-response (ESFR) sprinklers.
3. Smoke and heat removal shall not be required in areas of buildings equipped with control mode special application sprinklers with a response time index of 50(m × s)$^{1/}_{2}$ or less that are listed to control a fire in stored commodities with 12 or fewer sprinklers.

910.2.1 Group F-1 or S-1. Smoke and heat vents installed in accordance with Section 910.3 or a mechanical smoke removal system installed in accordance with Section 910.4 shall be installed in buildings and portions thereof used as a Group F-1 or S-1 occupancy having more than 50,000 square feet (4645 m^2) of undivided area. In occupied portions of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the upper surface of the story is not a roof assembly, a mechanical smoke removal system in accordance with Section 910.4 shall be installed.

Exception: *Group F-1 aircraft manufacturing buildings and* Group S-1 aircraft repair hangars.

910.2.2 High-piled combustible storage. Smoke and heat removal required by Table 3206.2 for buildings and portions thereof containing high-piled combustible storage shall be installed in accordance with Section 910.3 in unsprinklered buildings. In buildings and portions thereof containing high-piled combustible storage equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, a smoke and heat removal system shall be installed in accordance with Section 910.3 or 910.4. In occupied portions of a building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 where the upper surface of the story is not a roof assembly, a mechanical smoke removal system in accordance with Section 910.4 shall be installed.

910.3 Smoke and heat vents. The design and installation of smoke and heat vents shall be in accordance with Sections 910.3.1 through 910.3.3.

910.3.1 Listing and labeling. Smoke and heat vents shall be listed and labeled to indicate compliance with UL 793 or FM 4430 *or ICC-ES AC 331.*

910.3.2 Smoke and heat vent locations. Smoke and heat vents shall be located 20 feet (6096 mm) or more from adjacent lot lines and fire walls and 10 feet (3048 mm) or more from fire barriers. Vents shall be uniformly located within the roof in the areas of the building where the vents are required to be installed by Section 910.2, with consideration given to roof pitch, sprinkler location and structural members.

910.3.3 Smoke and heat vents area. The required aggregate area of smoke and heat vents shall be calculated as follows:

For buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1:

Equation 9-3 $A_{VR} = V/9000$

where:

A_{VR} = The required aggregate vent area (ft^2).

V = Volume (ft^3) of the area that requires smoke removal.

For unsprinklered buildings:

Equation 9-4 $A_{VR} = A_{FA}/50$

where:

A_{VR} = The required aggregate vent area (ft^2).

A_{FA} = The area of the floor in the area that requires smoke removal.

910.3.4 Vent operation. Smoke and heat vents shall be capable of being operated by approved automatic and manual means.

910.3.5 Fusible link temperature rating. Where vents are installed in areas provided with automatic fire sprinklers and the vents operate by fusible link, the fusible link shall have a temperature rating of 360°F (182°C).

910.4 Mechanical smoke removal systems. Mechanical smoke removal systems shall be designed and installed in accordance with Sections 910.4.1 through 910.4.7.

910.4.1 Automatic sprinklers required. The building shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

910.4.2 Exhaust fan construction. Exhaust fans that are part of a mechanical smoke removal system shall be rated for operation at 221°F (105°C). Exhaust fan motors shall be located outside of the exhaust fan airstream.

910.4.3 System design criteria. The mechanical smoke removal system shall be sized to exhaust the building at a minimum rate of two air changes per hour based on the volume of the building or portion thereof without contents. The capacity of each exhaust fan shall not exceed 30,000 cubic feet per minute (14.2 m^3/s).

910.4.3.1 Makeup air. Makeup air openings shall be provided within 6 feet (1829 mm) of the floor level. Operation of makeup air openings shall be manual or automatic. The minimum gross area of makeup air inlets shall be 8 square feet per 1,000 cubic feet per minute (0.74 m^2 per 0.4719 m^3/s) of smoke exhaust.

910.4.4 Activation. The mechanical smoke removal system shall be activated by manual controls only.

910.4.5 Manual control location. Manual controls shall be located where they are able to be accessed by the fire service from an exterior door of the building and separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

910.4.6 Control wiring. Wiring for operation and control of mechanical smoke removal systems shall be connected ahead of the main disconnect in accordance with Section 701.12E of *the California Electrical Code* and be protected against interior fire exposure to temperatures in excess of 1,000°F (538°C) for a period of not less than 15 minutes.

910.4.7 Controls. Where building air-handling and mechanical smoke removal systems are combined or where independent building air-handling systems are provided, fans shall automatically shut down in accordance with the *California Mechanical Code*. The manual controls provided for the smoke removal system shall have the capability to override the automatic shutdown of fans that are part of the smoke removal system.

910.5 Maintenance and testing. Maintenance and testing of smoke and heat vents and mechanical smoke removal systems shall be in accordance with Sections 910.5.1 and 910.5.2. A written record of inspection, testing and maintenance that includes the date, identification of personnel involved, any unsatisfactory result, corrective action taken and replaced parts shall be maintained on the premises.

910.5.1 Smoke and heat vents. Smoke and heat vents shall be maintained in an operative condition. Inspection, testing and maintenance shall be in accordance with NFPA 204 except as follows:

1. Mechanically operated smoke and heat vents shall be inspected annually and operationally tested not less than every 5 years.
2. Gravity dropout smoke and heat vents shall be inspected annually.
3. Fused, damaged or painted fusible links shall be replaced.

910.5.2 Mechanical smoke removal systems. Mechanical smoke removal systems shall be maintained in accordance with NFPA 204 and the equipment manufacturer's instructions except as follows:

1. Systems shall be inspected and operationally tested annually.
2. Testing shall include the operation of all system components, controls and ancillary equipment, such as makeup air openings.
3. A written schedule for routine maintenance and operational testing shall be established and testing shall be conducted in accordance with the schedule.

SECTION 911—EXPLOSION CONTROL

911.1 General. Explosion control shall be provided in the following locations:

1. Where a structure, room or space is occupied for purposes involving explosion hazards as identified in Table 911.1.
2. Where quantities of hazardous materials specified in Table 911.1 exceed the maximum allowable quantities in Table 5003.1.1(1).

Such areas shall be provided with explosion (deflagration) venting, explosion (deflagration) prevention systems or barricades in accordance with this section and NFPA 68, NFPA 69 or NFPA 495 as applicable. Deflagration venting shall not be utilized as a means to protect buildings from detonation hazards.

TABLE 911.1—EXPLOSION CONTROL REQUIREMENTS[f]

MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Combustible dusts[a]	—	Not required	Required
Cryogenic fluids	Flammable	Not required	Required

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TABLE 911.1—EXPLOSION CONTROL REQUIREMENTS[f]—continued			
MATERIAL	CLASS	EXPLOSION CONTROL METHODS	
		Barricade construction	Explosion (deflagration) venting or explosion (deflagration) prevention systems
Hazard Category			
Explosives	Division 1.1	Required	Not required
	Division 1.2	Required	Not required
	Division 1.3	Not required	Required
	Division 1.4[i]	Not required	Required
	Division 1.5	Required	Not required
	Division 1.6	Required	Not required
Flammable gas	Gaseous	Not required	Required[h]
	Liquefied	Not required	Required[h]
Flammable liquids	IA[b]	Not required	Required
	IB[c]	Not required	Required
Organic peroxides	Unclassified detonable	Required	Not permitted
	I	Required	Not permitted
Oxidizer liquids and solids	4	Required	Not permitted
Pyrophoric	Gases	Not required	Required
Unstable (reactive)	4	Required	Not permitted
	3 detonable	Required	Not permitted
	3 nondetonable	Not required	Required
Water-reactive liquids and solids	3	Not required	Required
	2[e]	Not required	Required
Special Uses			
Acetylene generator rooms	—	Not required	Required
Electrochemical energy storage systems[g]	—	Not required	Required
Energy storage systems[g]	—	Not required	Required
Grain processing	—	Not required	Required
Liquefied petroleum gas distribution facilities	—	Not required	Required
Where explosion hazards exist[d]	Detonation	Required	Not permitted
	Deflagration	Not required	Required

For SI: 1 inch per second = 25.4 mm/s.

a. Combustible dusts where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2. See definition of "Combustible dust" in Chapter 2.

b. Storage or use.

c. In open use or dispensing.

d. Rooms containing dispensing and use of hazardous materials where an explosive environment can occur because of the characteristics or nature of the hazardous materials or as a result of the dispensing or use process.

e. A method of explosion control shall be provided where Class 2 water-reactive materials can form potentially explosive mixtures.

f. Explosion venting is not required for Group H-5 Fabrication Areas complying with Chapter 27 and the *California Building Code*.

g. Where explosion control is required in Section 1207.6.3.

h. Not required for Category 1B Flammable Gases having a burning velocity not exceeding 3.9 inches per second.

i. Does not apply to consumer fireworks, 1.4G.

911.2 Required deflagration venting. Areas that are required to be provided with deflagration venting shall comply with the following:

1. Walls, ceilings and roofs exposing surrounding areas shall be designed to resist a minimum internal pressure of 100 pounds per square foot (psf) (4788 Pa). The minimum internal design pressure shall be not less than five times the maximum internal relief pressure specified in Item 5 of this section.
2. Deflagration venting shall be provided only in exterior walls and roofs.

   Exception: Where sufficient exterior wall and roof venting cannot be provided because of inadequate exterior wall or roof area, deflagration venting shall be allowed by specially designed shafts vented to the exterior of the building.
3. Deflagration venting shall be designed to prevent unacceptable structural damage. Where relieving a deflagration, vent closures shall not produce projectiles of sufficient velocity and mass to cause life threatening injuries to the occupants or other persons on the property or adjacent public ways.

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4. The aggregate clear area of vents and venting devices shall be governed by the pressure resistance of the construction assemblies specified in Item 1 of this section and the maximum internal pressure allowed by Item 5 of this section.
5. Vents shall be designed to withstand loads in accordance with the *California Building Code*. Vents shall consist of any one or any combination of the following to relieve at a maximum internal pressure of 20 pounds per square foot (958 Pa), but not less than the loads required by the *California Building Code*:
    5.1. Exterior walls designed to release outward.
    5.2. Hatch covers.
    5.3. Outward swinging doors.
    5.4. Roofs designed to uplift.
    5.5. Venting devices listed for the purpose.
6. Vents designed to release from the exterior walls or roofs of the building when venting a deflagration shall discharge directly to the exterior of the building where an unoccupied space not less than 50 feet (15 240 mm) in width is provided between the exterior walls of the building and the lot line.

    Exception: Vents complying with Item 7 of this section.
7. Vents designed to remain attached to the building when venting a deflagration shall be so located that the discharge opening shall be not less than 10 feet (3048 mm) vertically from window openings and exits in the building and 20 feet (6096 mm) horizontally from exits in the building, from window openings and exits in adjacent buildings on the same lot and from the lot line.
8. Discharge from vents shall not be into the interior of the building.

911.3 Explosion prevention systems. Explosion prevention systems shall be of an approved type and installed in accordance with the provisions of this code and NFPA 69.

911.4 Deflagration venting. Deflagration venting shall be of an approved type and installed in accordance with the provisions of this code and NFPA 68.

911.5 Barricades. Barricades shall be designed and installed in accordance with NFPA 495.

SECTION 912—FIRE DEPARTMENT CONNECTIONS

912.1 Installation. Fire department connections shall be installed in accordance with the NFPA standard applicable to the system design and shall comply with Sections 912.2 through 912.7.

912.2 Location. With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be approved by the fire code official.

912.2.1 Visible location. Fire department connections shall be located on the street side of buildings or facing approved fire apparatus access roads, fully visible and recognizable from the street, fire apparatus access road or nearest point of fire department vehicle access or as otherwise approved by the fire code official.

912.2.2 Existing buildings. On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building. Such sign shall have the letters "FDC" not less than 6 inches (152 mm) high and words in letters not less than 2 inches (51 mm) high or an arrow to indicate the location. Such signs shall be subject to the approval of the fire code official.

912.3 Fire hose threads. Fire hose threads used in connection with standpipe systems shall be approved and shall be compatible with fire department hose threads.

912.4 Access. Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object. Access to fire department connections shall be approved by the fire code official.

Exceptions:

1. Fences, where provided with an access gate equipped with a sign complying with the legend requirements of Section 912.5 and a means of emergency operation. The gate and the means of emergency operation shall be approved by the fire code official and maintained operational at all times.
2. *When acceptable to the fire enforcing agency, fire department connections for Group I-3 detention facilities may be located inside all security walls or fences on the property.*

912.4.1 Locking fire department connection caps. The fire code official is authorized to require locking caps on fire department connections for water-based fire protection systems where the responding fire department carries appropriate key wrenches for removal.

912.4.2 Clear space around connections. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or approved by the fire code official.

912.4.3 Physical protection. Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

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912.5 Signs. A metal sign with raised letters not less than 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: "AUTOMATIC SPRINKLERS," "STANDPIPES," "TEST CONNECTION," "STANDPIPE AND AUTOSPKR" or "AUTOSPKR AND STANDPIPE," or a combination thereof as applicable.

912.5.1 Lettering. Each fire department connection (FDC) shall be designated by a sign with letters not less than 1 inch (25.4 mm) in height. For manual standpipe systems, the sign shall also indicate that the system is manual and that it is either wet or dry.

912.5.2 Serving multiple buildings. Where a fire department connection (FDC) services multiple buildings, structures or locations, a sign shall be provided indicating the building, structures or locations served. Where the FDC does not serve the entire building, a sign shall be provided indicating the portions of the building served.

912.5.3 Multiple or combined systems. Where combination or multiple system types are supplied by the fire department connection, the sign or combination of signs shall indicate both designated services.

912.5.4 Indication of pressure. The sign also shall indicate the pressure required at the outlets to deliver the standpipe system demand.

Exception: Where the pressure required is 150 pounds per square inch (1034 kPa) or less.

912.6 Backflow protection. The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the *Health and Safety Code Section 13114.7.*

912.7 Inspection, testing and maintenance. Fire department connections shall be periodically inspected, tested and maintained in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5*. Records of inspection, testing and maintenance shall be maintained.

SECTION 913—FIRE PUMPS

913.1 General. Where provided, fire pumps for fire protection systems shall be installed in accordance with this section and NFPA 20.

Exception: Pumps for automatic sprinkler systems installed in accordance with Section 903.3.1.3, or Section *R309* of the *California Residential Code*.

913.2 Protection against interruption of service. The fire pump, driver and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions.

913.2.1 Protection of fire pump rooms. Rooms where fire pumps are located shall be separated from all other areas of the building in accordance with Section 913.2.1 of the *California Building Code*.

913.2.2 Circuits supplying fire pumps. Cables used for survivability of circuits supplying fire pumps shall be protected using one of the following methods:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
2. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a fire-resistance rating of not less than 1 hour.
4. The cable or raceway is encased in a minimum of 2 inches (51 mm) of concrete.

Exception: This section shall not apply to cables, or portions of cables, located within a fire pump room or generator room that is separated from the remainder of the occupancy with fire-resistance-rated construction.

913.3 Temperature of pump room. Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40°F (5°C).

913.3.1 Engine manufacturer's recommendation. Temperature of the pump room, pump house or area where engines are installed shall never be less than the minimum recommended by the engine manufacturer. The engine manufacturer's recommendations for oil heaters shall be followed.

913.4 Valve supervision. Where provided, the fire pump suction, discharge and bypass valves, and isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods:

1. Central-station, proprietary or remote-station signaling service.
2. Local signaling service that will cause the sounding of an audible signal at a constantly attended location.
3. Locking valves open.
4. Sealing of valves and approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner.

913.4.1 Test outlet valve supervision. Fire pump test outlet valves shall be supervised in the closed position.

913.5 Testing and maintenance. Fire pumps shall be inspected, tested and maintained in accordance with the requirements of this section and *California Code of Regulations, Title 19, Division 1, Chapter 5*. Records of inspection, testing and maintenance shall be maintained.

913.5.1 Acceptance test. Acceptance testing shall be done in accordance with the requirements of NFPA 20.

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913.5.2 Generator sets. Engine generator sets supplying emergency or standby power to fire pump assemblies shall be periodically tested in accordance with NFPA 110. Records of testing shall be maintained.

913.5.3 Transfer switches. Automatic transfer switches shall be periodically tested in accordance with NFPA 110. Records of testing shall be maintained.

913.5.4 Pump room environmental conditions. Tests of pump room environmental conditions, including heating, ventilation and illumination, shall be made to ensure proper manual or automatic operation of the associated equipment.

913.6 Fire pumps in high-rise buildings. *Engine-driven fire pumps and electric drive fire pumps supplied by generators shall both be provided with an on-premises fuel supply, sufficient for not less than 8-hour full-demand operation at 100 percent of the rated pump capacity in addition to all other required supply demands in accordance with NFPA 20 and this section.*

SECTION 914—FIRE PROTECTION BASED ON SPECIAL DETAILED REQUIREMENTS OF USE AND OCCUPANCY

914.1 General. This section shall specify where fire protection systems are required based on the detailed requirements of use and occupancy of the *California Building Code*.

914.2 Covered and open mall buildings. Covered and open mall buildings shall comply with Sections 914.2.1 through 914.2.4.

914.2.1 Automatic sprinkler system. Covered and open mall buildings and buildings connected shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, which shall comply with the all of the following:

1. The automatic sprinkler system shall be complete and operative throughout occupied space in the mall building prior to occupancy of any of the tenant spaces. Unoccupied tenant spaces shall be similarly protected unless provided with approved alternative protection.
2. Sprinkler protection for the mall of a covered mall building shall be independent from that provided for tenant spaces or anchor buildings.
3. Sprinkler protection for the tenant spaces of an open mall building shall be independent from that provided for anchor buildings.
4. Sprinkler protection shall be provided beneath exterior circulation balconies located adjacent to an open mall.
5. Where tenant spaces are supplied by the same system, they shall be independently controlled.

Exception: An automatic sprinkler system shall not be required in spaces or areas of open parking garages separated from the covered or open mall in accordance with Section 402.4.2.3 of the *California Building Code* and constructed in accordance with Section 406.5 of the *California Building Code*.

914.2.2 Standpipe system. The covered and open mall building shall be equipped throughout with a standpipe system as required by Section 905.3.3.

914.2.3 Emergency voice/alarm communication system. Where the total floor area exceeds 50,000 square feet (4645 m^2) within either a covered mall building or within the perimeter line of an open mall building, an emergency voice/alarm communication system shall be provided. Access to emergency voice/alarm communication systems serving a mall, required or otherwise, shall be provided for the fire department. The system shall be provided in accordance with Section 907.5.2.2.

914.2.4 Fire department access to equipment. Rooms or areas containing controls for air-conditioning systems or fire protection systems shall be identified for use by the fire department.

914.3 High-rise buildings. High-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* shall comply with Sections 914.3.1 through 914.3.7.

914.3.1 Automatic sprinkler system. Buildings and structures shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and a secondary water supply where required by Section 914.3.2. *A sprinkler water-flow alarm-initiating device and a control valve with a supervisory signal-initiating device shall be provided at the lateral connection to the riser on each floor.*

Exception: An automatic sprinkler system shall not be required in spaces or areas of telecommunications equipment buildings used exclusively for telecommunications equipment, associated electrical power distribution equipment, batteries and standby engines, provided that those spaces or areas are equipped throughout with an automatic fire detection system in accordance with Section 907.2 and are separated from the remainder of the building by not less than 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or not less than 2-hour horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

914.3.1.1 Number of sprinkler *system* risers and system design. The number of sprinkler risers and design shall comply with Section 914.3.1.1.1 or 914.3.1.1.2 based on building height.

914.3.1.1.1 Buildings 420 feet or less in height. In buildings 420 feet (128 m) or less in height, sprinkler systems shall be supplied by a single standpipe or sprinkler express riser within each vertical water supply zone.

914.3.1.1.2 Buildings over 420 feet in height. In buildings more than 420 feet (128 m) in height, not fewer than two standpipes or sprinkler express risers shall supply automatic sprinkler systems within each vertical water supply zone. Each standpipe or sprinkler express riser shall supply automatic sprinkler systems on alternating floors within the vertical water supply zone such that two adjacent floors are not supplied from the same riser.

914.3.1.1.3 Riser location. Standpipe or sprinkler express risers shall be placed in interior exit stairways and ramps that are remotely located in accordance with Section 1007.

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914.3.1.2 Water supply to required fire pumps. In all buildings *having an occupied floor* that *is* more than *120* feet (*36 576 mm*) *above the lowest level of fire department vehicle access,* required fire pumps shall be supplied by connections to not fewer than two water mains located in different streets. Separate supply piping shall be provided between each connection to the water main and the pumps. Each connection and the supply piping between the connection and the pumps shall be sized to supply the flow and pressure required for the pumps to operate.

Exception: Two connections to the same main shall be permitted provided that the main is valved such that an interruption can be isolated so that the water supply will continue without interruption through not fewer than one of the connections.

914.3.1.2.1 Fire pumps. *Redundant fire pump systems shall be required for high-rise buildings having an occupied floor more than 200 feet above the lowest level of fire department vehicle access. Each fire pump system shall be capable of automatically supplying the required demand for the automatic sprinkler and standpipe systems.*

914.3.2 Secondary water supply. An automatic secondary on-site water supply having a *usable* capacity not less than the hydraulically calculated sprinkler demand, including the hose stream requirement, shall be provided for high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 ft above the lowest level of fire department vehicle access* assigned to Seismic Design Category C, D, E or F as determined by the *California Building Code*. An additional fire pump shall not be required for the secondary water supply unless needed to provide the minimum design intake pressure at the suction side of the fire pump supplying the automatic sprinkler system. The secondary water supply shall have a *useable capacity of not less than the hydraulically calculated sprinkler demand plus 100 GPM for the inside hose stream, allowance for a* duration of not less than 30 minutes as determined by the occupancy hazard classification in accordance with NFPA 13*, whichever is greater. The Class I standpipe system demand shall not be required to be included in the secondary on-site water supply calculations. In no case shall the secondary on-site water supply be less than 15,000 gallons.*

914.3.3 Fire alarm system. A fire alarm system shall be provided in accordance with Section 907.2.13.

914.3.4 Automatic smoke detection. Smoke detection shall be provided in accordance with Section 907.2.13.1.

914.3.5 Emergency voice/alarm communication system. An emergency voice/alarm communication system shall be provided in accordance with Section 907.5.2.2.

914.3.6 Emergency responder communication coverage. In-building, two-way emergency responder communication coverage shall be provided in accordance with Section 510.

914.3.7 Fire command. A fire command center complying with Section 508 shall be provided in a location approved by the fire department.

914.3.8 Smoke control.

914.3.8.1 Smoke control system. *All portions of high-rise buildings shall be provided with a smoke control system in accordance with California Building Code, Section 909.*

914.3.8.2 Smokeproof exit enclosures. *Every exit enclosure in high-rise buildings shall comply with California Building Code, Sections 909.20 and 1023.12. Every required stairway in Group I-2 occupancies serving floors more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access shall comply with Sections 909.20 and 1023.12 of the California Building Code.*

Exception: *In high-rise buildings, exit enclosures serving three or less adjacent floors where one of the adjacent floors is the level of exit discharge.*

914.4 Atriums. Atriums shall comply with Sections 914.4.1 and 914.4.2.

914.4.1 Automatic sprinkler system. An approved automatic sprinkler system shall be installed throughout the entire building.

Exceptions:

1. That area of a building adjacent to or above the atrium need not be sprinklered, provided that portion of the building is separated from the atrium portion by not less than a 2-hour fire barrier constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.
2. Where the ceiling of the atrium is more than 55 feet (16 764 mm) above the floor, sprinkler protection at the ceiling of the atrium is not required.

914.4.2 Fire alarm system. A fire alarm system shall be provided where required by Section 907.2.14.

914.5 Underground buildings. Underground buildings shall comply with Sections 914.5.1 through 914.5.5.

914.5.1 Automatic sprinkler system. The highest level of exit discharge serving the underground portions of the building and all levels below shall be equipped with an automatic sprinkler system installed in accordance with Section 903.3.1.1. Waterflow switches and control valves shall be supervised in accordance with Section 903.4.1.

914.5.2 Smoke control system. A smoke control system is required to control the migration of products of combustion in accordance with Section 909 and provisions of this section. Smoke control shall restrict movement of smoke to the general area of fire origin and maintain means of egress in a usable condition.

914.5.3 Compartment smoke control system. Where compartmentation is required by Section 405.4 of the *California Building Code*, each compartment shall have an independent smoke control system. The system shall be automatically activated and capable of manual operation in accordance with Section 907.2.18.

914.5.4 Fire alarm system. A fire alarm system shall be provided where required by Sections 907.2.18 and 907.2.19.

914.5.5 Standpipe system. The underground building shall be provided throughout with a standpipe system in accordance with Section 905.

914.6 Stages. Stages shall comply with Section 914.6.1.

914.6.1 Automatic sprinkler system. Stages shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1. Sprinklers shall be installed under the roof and gridiron and under all catwalks and galleries over the stage. Sprinklers shall be installed in dressing rooms, performer lounges, shops and storerooms accessory to such stages.

Exceptions:

1. Sprinklers are not required under stage areas less than 4 feet (1219 mm) in clear height utilized exclusively for storage of tables and chairs, provided that the concealed space is separated from the adjacent spaces by Type X gypsum board not less than $^{5}/_{8}$ inch (15.9 mm) in thickness.
2. Sprinklers are not required for stages 1,000 square feet (93 m^2) or less in area and 50 feet (15 240 mm) or less in height where curtains, scenery or other combustible hangings are not retractable vertically. Combustible hangings shall be limited to a single main curtain, borders, legs and a single backdrop.
3. Sprinklers are not required within portable orchestra enclosures on stages.
4. Sprinklers are not required under catwalks and galleries where they are permitted to be omitted in accordance with Section 903.3.1.1.

914.7 Special amusement areas. Special amusement areas shall comply with Sections 914.7.1 *through* 914.7.*3 and Section 411 of the California Building Code.*

Exceptions:

1. Special amusement areas that are without walls or a roof and constructed to prevent the accumulation of smoke are not required to comply with this section.
2. Puzzle rooms provided with a means of egress that is unlocked, readily identifiable and always available are not required to comply with this section.

914.7.1 Automatic sprinkler system. Buildings containing special amusement areas shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where the special amusement area is temporary*; less than 180 days;* the sprinkler water supply shall be of an approved temporary means*; less than 180 days;* means *determined by the authority having jurisdiction.*

Exception: Automatic sprinklers are not required where the total floor area of a temporary*; less than 180 days;* special amusement area is less than 1,000 square feet (93 m^2) and the exit access travel distance from any point in the special amusement area to an exit is less than 50 feet (15 240 mm).

914.7.2 ***Fire alarm system.*** Buildings containing special amusement areas shall be equipped throughout with an automatic smoke detection system and an emergency voice/alarm communications system in accordance with Section 907. Presignal alarms and alarm activation shall comply with Sections 914.7.2.1 and 914.7.2.2, and emergency voice/alarm communications systems shall comply with Section 914.7.2.3.

914.7.2.1 Alarm presignal. Activation of any single smoke detector, the automatic sprinkler system or any other single automatic fire detection device shall immediately initiate an audible and visible alarm at a constantly attended location at the special amusement area from which emergency action can be initiated, including the capability of manual initiation of requirements in Section 914.7.2.2.

914.7.2.2 Alarm activation. Activation of two or more smoke detectors, a single smoke detector equipped with an alarm verification feature, two or more other approved fire detection devices, the automatic sprinkler system, or a manual control located at the constantly attended station required by Section 914.7.2.1 shall automatically accomplish all of the following:

1. Illuminate the means of egress with an illumination level not less than 1 footcandle (11 lux) at the walking surface level.
2. Stop conflicting or confusing sounds and visual distractions.
3. Activate approved directional exit markings.
4. Activate a prerecorded message, audible throughout the special amusement area *and throughout the exit access to the point of exit discharge,* instructing occupants to proceed to the nearest exit. Alarm signals used in conjunction with the prerecorded message shall produce a sound that is distinct from other sounds used during normal operation of the special amusement area.

914.7.2.3 Emergency voice/alarm communications system. An emergency voice/alarm communications system complying with Section 907.5.2.2 shall be installed in and audible throughout special amusement areas *and throughout the exit access to the point of exit discharge*. The emergency voice/alarm communications system is allowed to also serve as a public address system.

914.8 Aircraft-related occupancies. Aircraft-related occupancies shall comply with Sections 914.8.1 through 914.8.6.

914.8.1 Automatic smoke detection systems. Airport traffic control towers shall be provided with an automatic smoke detection system installed in accordance with Section 907.2.22.

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914.8.2 Automatic sprinkler system for new airport traffic control towers. Where an occupied floor is located more than 35 feet (10 668 mm) above the lowest level of fire department vehicle access, new airport traffic control towers shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

914.8.3 Fire suppression for aircraft hangars. Aircraft hangars shall be provided with a fire suppression system designed in accordance with NFPA 409, based on the classification for the hangar given in Table 914.8.3.

Exception: Where a fixed base operator has separate repair facilities on-site, Group II hangars operated by a fixed base operator used for storage of transient aircraft only shall have a fire suppression system, but the system shall be exempt from foam requirements.

TABLE 914.8.3—HANGAR FIRE SUPPRESSION REQUIREMENTS[a, b, c]

MAXIMUM SINGLE FIRE AREA (square feet)	*CALIFORNIA* BUILDING CODE TYPE OF CONSTRUCTION								
	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB
≥ 40,001	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I	Group I
40,000	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
30,000	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II	Group II
20,000	Group III	Group III	Group II	Group II	Group II	Group II	Group II	Group II	Group II
15,000	Group III	Group III	Group III	Group II	Group III	Group II	Group III	Group II	Group II
12,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II	Group II
8,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group II
5,000	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III	Group III

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Aircraft hangars with a door height greater than 28 feet shall be provided with fire suppression for a Group I hangar regardless of maximum fire area.

b. Groups shall be as classified in accordance with NFPA 409.

c. Membrane structures complying with Section 3102 of the *California Building Code* shall be classified as a Group IV hangar.

914.8.3.1 Hazardous operations. Any Group III aircraft hangar in accordance with Table 914.8.3 that contains hazardous operations including, but not limited to, the following shall be provided with a Group I or II fire suppression system in accordance with NFPA 409 as applicable:

1. Doping.
2. Hot work including, but not limited to, welding, torch cutting and torch soldering.
3. Fuel transfer.
4. Fuel tank repair or maintenance not including defueled tanks in accordance with NFPA 409, inerted tanks or tanks that have never been fueled.
5. Spray finishing operations.
6. Total fuel capacity of all aircraft within the unsprinklered single fire area in excess of 1,600 gallons (6057 L).
7. Total fuel capacity of all aircraft within the maximum single fire area in excess of 7,500 gallons (28 390 L) for a hangar equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

914.8.3.2 Separation of maximum single fire areas. Maximum single fire areas established in accordance with hangar classification and construction type in Table 914.8.3 shall be separated by 2-hour fire walls constructed in accordance with Section 706 of the *California Building Code*. In determining the maximum single fire area as set forth in Table 914.8.3, ancillary uses that are separated from aircraft servicing areas by not less than a 1-hour fire barrier constructed in accordance with Section 707 of the *California Building Code* shall not be included in the area.

914.8.4 Finishing. The process of "doping," involving the use of a volatile flammable solvent, or of painting shall be carried on in a separate detached building equipped with automatic fire-extinguishing equipment in accordance with Section 903.

914.8.5 Residential aircraft hangar smoke alarms. Smoke alarms shall be provided within residential aircraft hangars in accordance with Section 907.2.21.

914.8.6 Aircraft paint hangar fire suppression. Aircraft paint hangars shall be provided with fire suppression as required by NFPA 409.

914.9 Application of flammable finishes. An automatic sprinkler system or fire-extinguishing system shall be provided in all spray rooms and spray booths, and shall be installed in accordance with Chapter 9.

914.10 Drying rooms. Drying rooms designed for high-hazard materials and processes, including special occupancies as provided for in Chapter 4 of the *California Building Code*, shall be protected by an approved automatic fire-extinguishing system complying with the provisions of Chapter 9.

914.11 Ambulatory care facilities. Occupancies classified as ambulatory care facilities shall comply with Sections 914.11.1 through 914.11.3.

914.11.1 Automatic sprinkler systems. An automatic sprinkler system shall be provided for ambulatory care facilities in accordance with Section 903.2.2.1.

914.11.2 Manual fire alarm systems. A manual fire alarm system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.

914.11.3 Fire alarm systems. An automatic smoke detection system shall be provided for ambulatory care facilities in accordance with Section 907.2.2.1.

SECTION 915—CARBON MONOXIDE (CO) DETECTION

915.1 General. Carbon monoxide (CO) detection shall be installed in new buildings in accordance with Section 915.1.1 *through 915.7*. Carbon monoxide detection shall be installed in existing buildings in accordance with *this section and* Section 1103.9.

Pursuant to Health and Safety Code Section 17926, carbon monoxide detection shall be installed in all existing Group R buildings as required in this section.

Exception: Carbon monoxide detection is not required in Group S, Group F and Group U occupancies that are not normally occupied.

915.1.1 Where required. Carbon monoxide detection shall be installed in the locations specified in Section 915.2 where any of the following conditions exist.

1. In buildings that contain a CO source.
2. In buildings that contain or are supplied by a CO-producing forced-air furnace.
3. In buildings with attached private garages.
4. In buildings that have a CO-producing vehicle that is used within the building.

915.2 Locations. Carbon monoxide detection shall be installed *in accordance with the manufacturer's published instructions* in the locations specified in Sections 915.2.1 through 915.2.3.

915.2.1 Dwelling units. Carbon monoxide detection shall be installed in dwelling units *in the following locations:*

1. Outside of each separate sleeping area in the immediate vicinity of the bedrooms.

2. On every occupiable level of a dwelling unit, including basements.

3. Where a CO source is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

915.2.2 Sleeping units. Carbon monoxide detection shall be installed in sleeping units.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a CO source and is not served by a CO-producing forced-air furnace.

915.2.3 Group E occupancies. A carbon monoxide system that uses carbon monoxide detectors shall be installed in Group E occupancies *where classrooms include any of the conditions identified in Sections 915.1.2 through 915.1.6*. Alarm signals from carbon monoxide detectors shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

915.2.4 CO-producing forced-air furnace. Carbon monoxide detection complying with Item 2 of Section 915.1.1 shall be installed in all enclosed rooms and spaces served by a fuel-burning, forced-air furnace.

Exceptions:

1. Where a carbon monoxide detector is provided in the first room or space served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.
2. Dwelling units that comply with Section 915.2.1.

915.2.5 Private garages. Carbon monoxide detection complying with Item 3 of Section 915.1.1 shall be installed within enclosed occupiable rooms or spaces that are contiguous to the attached private garage.

Exceptions:

1. In buildings without communicating openings between the private garage and the building.
2. In rooms or spaces located more than one story above or below a private garage.
3. Where the private garage connects to the building through an open-ended corridor.
4. An open parking garage complying with Section 406.5 of the *California Building Code* or an enclosed parking garage complying with Section 406.6 of the *California Building Code* shall not be considered a private garage.
5. Dwelling units that comply with Section 915.2.1.

915.2.6 All other occupancies. For locations other than those specified in Sections 915.2.1 through 915.2.5, carbon monoxide detectors shall be installed on the ceiling of enclosed rooms or spaces containing CO-producing devices or served by a CO source forced-air furnace.

Exception: Where environmental conditions prohibit the installation of carbon monoxide detector in an enclosed room or space, carbon monoxide detectors shall be installed in an approved enclosed location contiguous with the room or space that contains a CO source.

915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

915.3.1 Alarm limitations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

915.3.2 Fire alarm system required. New buildings that are required by Section 907.2 to have a fire alarm system and by Section 915.2 to have carbon monoxide detectors shall be connected to the fire alarm system in accordance with NFPA 72.

915.3.3 Fire alarm systems not required. In new buildings that are not required by Section 907.2 to have a fire alarm system, carbon monoxide detection shall be provided by one of the following:

1. Carbon monoxide detectors connected to an approved carbon monoxide detection system in accordance with NFPA 72.
2. Carbon monoxide detectors connected to an approved combination system in accordance with NFPA 72.
3. Carbon monoxide detectors connected to an approved fire alarm system in accordance with NFPA 72.
4. Where approved by the fire code official, carbon monoxide alarms maintained in accordance with the manufacturer's instructions.

915.3.4 Installation. Carbon monoxide detection shall be installed in accordance with NFPA 72 and the manufacturer's instructions.

915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.

915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exceptions:

1. Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.
2. *Carbon monoxide alarms in Group R occupancies shall be permitted to receive their primary power from other power sources recognized for use by NFPA 720.*
3. *Carbon monoxide alarms in Group R occupancies shall be permitted to be battery-powered or plug-in with a battery backup in existing buildings built prior to January 1, 2011, under any of the following conditions:*
   - 3.1. *No construction is taking place.*
   - 3.2. *Repairs or alterations do not result in the removal of interior wall and ceiling finishes exposing the structure in areas/spaces where carbon monoxide alarms are required.*
   - 3.3. *Repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck.*
   - 3.4. *Work is limited to the installation, alteration or repair of plumbing, mechanical or electrical systems, which do not result in the removal of interior wall or ceiling finishes exposing the structure in areas/spaces where carbon monoxide alarms are required.*

915.4.2 Listings. *Residential* carbon monoxide alarms shall be listed in accordance with UL 2034.

No person shall install, market, distribute, offer for sale or sell any carbon monoxide device in the State of California unless the device and instructions have been approved and listed by the Office of the State Fire Marshal.

➡ **915.4.3 Combination alarms.** Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 217 and UL 2034. *Combination carbon monoxide/smoke alarms shall comply with Section 915, and all requirements for listing and approval by the Office of the State Fire Marshal for smoke alarms.*

915.4.4 Interconnection. Where more than one carbon monoxide alarm is required to be installed *within a dwelling unit or within a sleeping unit in Group R occupancies, the alarms shall be interconnected in a manner that activation of one alarm shall activate all of the alarms in the individual unit.*

***Exception**: Interconnection is not required in existing buildings, built prior to January 1, 2011, under any of the following conditions:*

1. *Physical interconnection is not required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.*
2. *No construction is taking place.*
3. *Repairs or alterations do not result in the removal of interior wall and ceiling finishes exposing the structure in areas/spaces where carbon monoxide alarms are required.*
4. *Repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding or the addition or replacement of windows or doors, or the addition of a porch or deck.*
5. *Work is limited to the installation, alteration or repair of plumbing, mechanical or electrical systems, which do not result in the removal of interior wall or ceiling finishes exposing the structure in areas/spaces where carbon monoxide alarms are required.*

915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

915.5.1 General. Carbon monoxide detectors shall be listed in accordance with UL 2075.

915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 72.

915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors shall be an acceptable alternative to carbon monoxide detectors, provided that they are listed in accordance with UL 268 and UL 2075.

Combination carbon monoxide/smoke alarms shall comply with Section 915, and all requirements for listing and approval by the Office of the State Fire Marshal for smoke alarms.

915.5.4 Occupant notification. Activation of a carbon monoxide detector shall annunciate at the control unit and shall initiate audible and visible alarm notification throughout the building.

Exception: Occupant notification is permitted to be limited to the area where the carbon monoxide alarm signal originated and other signaling zones in accordance with the fire safety plan, provided that the alarm signal from an activated carbon monoxide detector is automatically transmitted to an approved on-site location or off-premises location.

915.5.5 Duct detection. Carbon monoxide detectors placed in environmental air ducts or plenums shall not be used as a substitute for the required protection in Section 915.

915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with NFPA 72. Carbon monoxide alarms and carbon monoxide detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.6.1 Enclosed parking garages. Carbon monoxide and nitrogen dioxide detectors installed in enclosed parking garages in accordance with Section *403.7.2* of the *California Mechanical Code* shall be maintained in accordance with the manufacturer's instructions and their listing. Detectors that become inoperable or begin producing end-of-life signals shall be replaced.

915.7 Visible alarms. *In buildings containing covered multifamily dwellings as defined in Chapter 2, all required carbon monoxide alarms shall be equipped with the capability to support visible alarm notification in accordance with NFPA 720.*

SECTION 916—GAS DETECTION SYSTEMS

916.1 Gas detection systems. Gas detection systems required by this code shall comply with Sections 916.2 through 916.11.

916.2 Permits. Permits shall be required as set forth in Section 105.6.11.

916.2.1 Construction documents. Documentation of the gas detection system design and equipment to be used that demonstrates compliance with the requirements of this code shall be provided with the application for permit.

916.3 Equipment. Gas detection system equipment shall be designed for use with the gases being detected and shall be installed in accordance with manufacturer's instructions.

916.4 Power connections. Gas detection systems shall be permanently connected to the building electrical power supply or shall be permitted to be cord connected to an unswitched receptacle using an approved restraining means that secures the plug to the receptacle.

916.5 Emergency and standby power. Standby or emergency power shall be provided or the gas detection system shall initiate a trouble signal at an approved location if the power supply is interrupted.

916.6 Sensor locations. Sensors shall be installed in approved locations where leaking gases are expected to accumulate.

916.7 Gas sampling. Gas sampling shall be performed continuously. Sample analysis shall be processed immediately after sampling, except as follows:

1. For HPM gases, sample analysis shall be performed at intervals not exceeding 30 minutes.
2. For toxic gases that are not HPM, sample analysis shall be performed at intervals not exceeding 5 minutes, in accordance with Section 6004.2.2.7.
3. Where a less frequent or delayed sampling interval is approved.

916.8 System activation. A gas detection alarm shall be initiated where any sensor detects a concentration of gas exceeding the following thresholds:

1. For flammable gases, a gas concentration exceeding 25 percent of the lower flammability limit (LFL).
2. For nonflammable gases, a gas concentration exceeding one-half of the IDLH, unless a different threshold is specified by the section of this code requiring a gas detection system.

Upon activation of a gas detection alarm, alarm signals or other required responses shall be as specified by the section of this code requiring a gas detection system. Audible and visible alarm signals associated with a gas detection alarm shall be distinct from fire alarm and carbon monoxide alarm signals.

916.9 Signage. Signs shall be provided adjacent to gas detection system alarm signaling devices that advise occupants of the nature of the signals and actions to take in response to the signal.

916.10 Fire alarm system connections. Gas sensors and gas detection systems shall not be connected to fire alarm systems unless approved and connected in accordance with the fire alarm equipment manufacturer's instructions.

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916.11 Inspection, testing and sensor calibration. Inspection and testing of gas detection systems shall be conducted not less than annually. Sensor calibration shall be confirmed at the time of sensor installation and calibration shall be performed at the frequency specified by the sensor manufacturer.

SECTION 917—MASS NOTIFICATION SYSTEMS

917.1 College and university campuses. Prior to construction of a new building requiring a fire alarm system on a multiple-building college or university campus having a cumulative building occupant load of 1,000 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

917.2 Group E occupancies Prior to construction of a new building containing a Group E occupancy requiring a fire alarm system and having an occupant load of 500 or more, a mass notification risk analysis shall be conducted in accordance with NFPA 72. Where the risk analysis determines a need for mass notification, an approved mass notification system shall be provided in accordance with the findings of the risk analysis.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 10 – MEANS OF EGRESS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
[T-19 §4.1 (a)]				X																			
[T-19 §4.1 (b)]				X																			
1003.1			X																				
1003.2			X																				
1003.3			X																				
1003.3.1			X																				
1003.3.3.1			X																				
1003.3.4			X																				
1003.5			X																				
[T-19 §3.27]				X																			
Table 1004.5			X																				
1004.6				X																			
[T-19 §3.30]				X																			
1004.9			X																				
1005.3.1			X																				
1005.3.2			X																				
1005.7.1			X																				
1005.7.2			X																				
1006.2.1			X																				
Table 1006.2.1			X																				
1006.2.2.2			X																				
1006.2.2.3			X																				
1006.2.2.4			X																				
1006.2.2.7			X																				
1006.2.2.8			X																				
1006.3.4			X																				
Table 1006.3.4(1)			X																				
Table 1006.3.4(2)			X																				
1008.2			X																				
1008.3			X																				
1009.1			X																				
1009.2			X																				
1009.4 – 1009.4.1			X																				
1009.5			X																				
1009.6.3			X																				
1009.8.2			X																				

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CHAPTER 10 – MEANS OF EGRESS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
1009.10			X																				
1009.12			X																				
1010.1.1			X																				
1010.1.1.1, Exceptions			X																				
1010.1.2 – 1010.1.2.1			X																				
1010.1.4			X																				
1010.1.6 – 1010.1.7			X																				
1010.2.2			X																				
1010.2.3			X																				
1010.2.4			X																				
1010.2.7.1			X																				
1010.2.7.2			X																				
1010.2.8			X																				
1010.2.11			X																				
1010.2.11.1			X																				
1010.2.12			X																				
1010.2.12.1			X					X															
1010.2.13			X																				
1010.2.15 *Reserved*			X																				
1011.2			X																				
1011.5.2			X																				
1011.6			X																				
1011.11			X					X															
1011.15			X																				
1011.16			X																				
1012.6.3			X																				
1013.1			X																				
1013.2			X																				
1013.4			X																				
1013.7			X																				
1013.8			X																				
1014.9			X																				
1015.2			X																				
1015.3			X																				
1015.4			X																				
1016.2			X																				
Table 1017.2			X																				
1018								X															
[T-19 §3.06 (a)]				X																			
[T-19 §3.06 (b)]				X																			
1018.3			X																				
1019.3			X																				
1019.4			X																				

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CHAPTER 10 – MEANS OF EGRESS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
1020.2, Exception 6			X																				
Table 1020.2			X																				
Table 1020.3			X																				
1020.5			X																				
1020.6			X																				
1020.7			X																				
1022.3			X																				
1023.2			X																				
1023.9			X				X	X															
1023.9.1			X																				
1024.2			X																				
1025.1			X																				
1026.4.1			X																				
1026.4.2			X																				
1026.6			X																				
1028.5			X																				
1029.1			X																				
1030.1			X																				
1030.2			X																				
1030.3			X																				
1030.3.1			X																				
1030.6.3.2			X																				
1030.9.1			X																				
[T-19 §3.06 (a)]				X																			
1031.2			X																				
1031.2.1			X																				
[T-19 §4.2]				X																			
[T-19 §4.3 (a-c)]				X																			
[T-19 §4.4]				X																			
[T-19 §4.5 (a)]				X																			
[T-19 §4.6 (a)(b)]				X																			
[T-19 §3.11 (a-d)]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
10
MEANS OF EGRESS

User note:

About this chapter: Chapter 10 provides the general criteria for designing the means of egress established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. This chapter addresses all portions of the egress system (exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics that will permit the safe use of components without special knowledge or effort are specified.

The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Sections 1003 through 1031 are duplicated text from Chapter 10 of the *California Building Code*; however, the *California Fire Code* contains an additional Section 1032 on maintenance of the means of egress system in existing buildings. Retroactive minimum means of egress requirements for existing buildings are found in Chapter 11.

SECTION 1001—ADMINISTRATION

1001.1 General. Buildings or portions thereof shall be provided with a means of egress system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of means of egress components required to provide an approved means of egress from structures and portions thereof. Sections 1003 through 1031 shall apply to new construction. Section 1032 shall apply to existing buildings.

Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures shall comply with the *California Residential Code*.

[BE] 1001.2 Minimum requirements. It shall be unlawful to alter a building or structure in a manner that will reduce the number of exits or the capacity of the means of egress to less than required by this code.

SECTION 1002—DEFINITIONS

[BE] 1002.1 Definitions. The following terms are defined in Chapter 2:

ACCESSIBLE MEANS OF EGRESS.
AISLE.
AISLE ACCESSWAY.
ALTERNATING TREAD DEVICE.
AREA OF REFUGE.
AUTOMATIC FLUSH BOLT.
BLEACHERS.
BREAKOUT.
CIRCULATION PATH.
COMMON PATH OF EGRESS TRAVEL.
CONSTANT LATCHING BOLT.
CORRIDOR.
DEAD BOLT.
DEFEND-IN-PLACE.
DOOR, BALANCED.
EGRESS COURT.
EMERGENCY ESCAPE AND RESCUE OPENING.
EXIT.
EXIT ACCESS.
EXIT ACCESS DOORWAY.
EXIT ACCESS RAMP.
EXIT ACCESS STAIRWAY.
EXIT DISCHARGE.
EXIT DISCHARGE, LEVEL OF.
EXIT PASSAGEWAY.
EXTERIOR EXIT RAMP.

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EXTERIOR EXIT STAIRWAY.
FIRE EXIT HARDWARE.
FIXED SEATING.
FLIGHT.
FLOOR AREA, GROSS.
FLOOR AREA, NET.
FOLDING AND TELESCOPIC SEATING.
GRADE FLOOR EMERGENCY ESCAPE AND RESCUE OPENINGS.
GRANDSTAND.
GUARD.
HANDRAIL.
HORIZONTAL EXIT.
INTERIOR EXIT RAMP.
INTERIOR EXIT STAIRWAY.
LOW ENERGY POWER-OPERATED DOOR.
MANUAL BOLT.
MEANS OF EGRESS.
MERCHANDISE PAD.
NOSING.
OCCUPANT LOAD.
OPEN-AIR ASSEMBLY SEATING.
OPEN-ENDED CORRIDOR.
OVERHEAD DOORSTOP.
PANIC HARDWARE.
PHOTOLUMINESCENT.
POWER-ASSISTED DOOR.
POWER-OPERATED DOOR.
PUBLIC WAY.
RAMP.
SCISSOR STAIRWAY.
SELF-LUMINOUS.
SMOKE-PROTECTED ASSEMBLY SEATING.
STAIR.
STAIRWAY.
STAIRWAY, INTERIOR EXIT.
STAIRWAY, SPIRAL.
WINDER.

[California Code of Regulations, Title 19, Division 1, §4.1(a)] Definitions.

(a) Burglar bars – Security bars located on the inside or outside of a door or window of a residential dwelling.

[California Code of Regulations, Title 19, Division 1, §4.1 (b)] Definitions.

(b) Residential Dwelling – A house, apartment, motel, hotel or other type of residential dwelling subject to the State Housing Law Part. 1.5 (commencing with Section 17910), Division 13 of Health and Safety Code and a manufactured home, mobilehome and multi-unit manufactured housing as defined in Part 2 (commencing with Section 18000) of Division 13 of the Health and Safety Code.

SECTION 1003—GENERAL MEANS OF EGRESS

[BE] 1003.1 Applicability. The general requirements specified in Sections 1003 through 1015 shall apply to all three elements of the means of egress system, in addition to those specific requirements for the exit access, the exit and the exit discharge detailed elsewhere in this chapter.

Exception: *Exiting requirements for Fixed Guideway Transit Systems shall be in accordance with Section 443 of the California Building Code.*

[BE] 1003.2 Ceiling height. The means of egress shall have a ceiling height of not less than 7 feet 6 inches (2286 mm) above the finished floor.

Exceptions:

1. Sloped ceilings in accordance with Section 1208.2 of the *California Building Code*.

2. Ceilings of dwelling units and sleeping units within residential occupancies in accordance with Section 1208.2 of the *California Building Code*.
3. Allowable projections in accordance with Section 1003.3.
4. Stair headroom in accordance with Section 1011.3.
5. Door height in accordance with Section 1010.1.1.
6. Ramp headroom in accordance with Section 1012.5.2.
7. The clear height of floor levels in vehicular and pedestrian traffic areas of public and private parking garages in accordance with Section 406.2.2 of the *California Building Code*.
8. Areas above and below mezzanine floors in accordance with Section 505.2 of the *California Building Code*.
9. *In Group I-2 and I-3 occupancies, the means of egress shall have a ceiling height of not less than 8 feet (2439 mm).*

[BE] 1003.3 Protruding objects. Protruding objects on circulation paths shall comply with the requirements of Sections 1003.3.1 through 1003.3.4.

Exception: *In Group I-2 occupancies, protruding objects shall not extend more than 12 inches (305 mm) below the minimum ceiling height required by Section 1003.2.*

[BE] 1003.3.1 Headroom. Protruding objects are permitted to extend below the minimum ceiling height required by Section 1003.2 where a minimum headroom of 80 inches (2032 mm) is provided over any circulation paths, including walks, corridors, aisles and passageways. *In other than Group I-2 occupancies,* 50 percent of the ceiling area of a means of egress shall be *permitted to be* reduced in height by protruding objects.

Exception: Door closers, overhead doorstops, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

A barrier shall be provided where the vertical clearance above a circulation path is less than 80 inches (2032 mm) high above the finished floor. The leading edge of such a barrier shall be located 27 inches (686 mm) maximum above the finished floor.

[BE] 1003.3.2 Post-mounted objects. A free-standing object mounted on a post or pylon shall not overhang that post or pylon more than 4 inches (102 mm) where the lowest point of the leading edge is more than 27 inches (686 mm) and less than 80 inches (2032 mm) above the finished floor. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (686 mm) maximum or 80 inches (2032 mm) minimum above the finished floor or ground.

Exception: These requirements shall not apply to sloping portions of handrails between the top and bottom riser of stairs and above the ramp run.

[BE] 1003.3.3 Horizontal projections. Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finished floor shall not project horizontally more than 4 inches (102 mm) into the circulation path.

Exception: Handrails are permitted to protrude $4^1/_2$ inches (114 mm) from the wall or guard.

1003.3.3.1 Horizontal projections for Group I-2 occupancies. *Structural elements, fixtures or furnishings shall not project horizontally from either side more than $1^1/_2$ inches (38 mm) into the required width of an exit access corridor serving any area caring for one or more nonambulatory or bedridden persons.*

Exceptions:

1. *Handrails are permitted to protrude $3^1/_2$ inches (89 mm) from the wall.*
2. *Alcohol-based hand-rub dispensers are permitted to protrude 4 inches.*
3. *Manual fire alarm boxes with a protective cover installed are permitted to protrude 4 inches.*

[BE] 1003.3.4 Clear width. Protruding objects shall not reduce the minimum clear width of accessible routes *as required by Chapter 11A or 11B of the California Building Code.*

[BE] 1003.4 Slip-resistant surface. Circulation paths of the means of egress shall have a slip-resistant surface and be securely attached.

[BE] 1003.5 Elevation change. Where changes in elevation of less than 12 inches (305 mm) exist in the means of egress, sloped surfaces shall be used. Where the slope is greater than 1 unit vertical in 20 units horizontal (5-percent slope), ramps complying with Section 1012 shall be used. Where the difference in elevation is 6 inches (152 mm) or less, the ramp shall be equipped with either handrails or floor finish materials that contrast with adjacent floor finish materials.

Exceptions:

1. Steps at exterior doors complying with Section 1010.1.4.
2. A stair with a single riser or with two risers and a tread is permitted at locations not required to be accessible by Chapter *11A or 11B of the California Building Code,* where the risers and treads comply with Section 1011.5, the minimum depth of the tread is 13 inches (330 mm) and not less than one handrail complying with Section 1014 is provided within 30 inches (762 mm) of the centerline of the normal path of egress travel on the stair.
3. A step is permitted in aisles serving seating that has a difference in elevation less than 12 inches (305 mm) at locations not required to be accessible by Chapter *11A or 11B of the California Building Code*, provided that the risers and treads comply with Section 1030.14 and the aisle is provided with a handrail complying with Section 1030.16.

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Throughout a story in a Group I-2 occupancy, any change in elevation in portions of the means of egress that serve nonambulatory persons shall be by means of a ramp or sloped walkway.

[BE] 1003.6 Means of egress continuity. The path of egress travel along a means of egress shall not be interrupted by a building element other than a means of egress component as specified in this chapter. Obstructions shall not be placed in the minimum width or required capacity of a means of egress component except projections permitted by this chapter. The minimum width or required capacity of a means of egress system shall not be diminished along the path of egress travel.

[BE] 1003.7 Elevators, escalators and moving walks. Elevators, escalators and moving walks shall not be used as a component of a required means of egress from any other part of the building.

Exception: Elevators used as an accessible means of egress in accordance with Section 1009.4.

SECTION 1004—OCCUPANT LOAD

[BE] 1004.1 Design occupant load. In determining means of egress requirements, the number of occupants for whom means of egress facilities are provided shall be determined in accordance with this section.

[California Code of Regulations, Title 19, Division 1, §3.27] Overcrowding.

The number of occupants of any building, structure or portion thereof, shall not exceed the permitted or posted capacity.

[BE] 1004.2 Cumulative occupant loads. Where the path of egress travel includes intervening rooms, areas or spaces, cumulative occupant loads shall be determined in accordance with this section.

[BE] 1004.2.1 Intervening spaces or accessory areas. Where occupants egress from one or more rooms, areas or spaces through others, the design occupant load shall be the combined occupant load of interconnected accessory or intervening spaces. Design of egress path capacity shall be based on the cumulative portion of occupant loads of all rooms, areas or spaces to that point along the path of egress travel.

[BE] 1004.2.2 Adjacent levels for mezzanines. That portion of the occupant load of a mezzanine with required egress through a room, area or space on an adjacent level shall be added to the occupant load of that room, area or space.

[BE] 1004.2.3 Adjacent stories. Other than for the egress components designed for convergence in accordance with Section 1005.6, the occupant load from separate stories shall not be added.

[BE] 1004.3 Multiple-function occupant load. Where an area under consideration contains multiple functions having different occupant load factors, the design occupant load for such area shall be based on the floor area of each function calculated independently.

[BE] 1004.4 Multiple occupancies. Where a building contains two or more occupancies, the means of egress requirements shall apply to each portion of the building based on the occupancy of that space. Where two or more occupancies utilize portions of the same means of egress system, those egress components shall meet the more stringent requirements of all occupancies that are served.

[BE] 1004.5 Areas without fixed seating. The number of occupants shall be computed at the rate of one occupant per unit of area as prescribed in Table 1004.5. For areas without fixed seating, the occupant load shall be not less than that number determined by dividing the floor area under consideration by the occupant load factor assigned to the function of the space as set forth in Table 1004.5. Where an intended function is not listed in Table 1004.5, the fire code official shall establish a function based on a listed function that most nearly resembles the intended function.

Exception: Where approved by the fire code official, the actual number of occupants for whom each occupied space, floor or building is designed, although less than those determined by calculation, shall be permitted to be used in the determination of the design occupant load.

[BE]TABLE 1004.5—MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6

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[BE]TABLE 1004.5—MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT—continued	
FUNCTION OF SPACE	**OCCUPANT LOAD FACTOR[a]**
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas[c]	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Laboratory *Educational (K–12)* *Laboratories, noneducational* *Laboratory suite[b]*	 50 net 100 net 200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the *California Building Code*
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

b. See California Building Code Section 453.2.

c. See California Building Code Section 408.3.13 for I-3 facilities.

[BE] 1004.5.1 Increased occupant load. The occupant load permitted in any building, or portion thereof, is permitted to be increased from that number established for the occupancies in Table 1004.5, provided that all other requirements of the code are met based on such modified number and the occupant load does not exceed one occupant per 7 square feet (0.65 m^2) of occupia-

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ble floor space. Where required by the fire code official, an approved aisle, seating or fixed equipment diagram substantiating any increase in occupant load shall be submitted. Where required by the fire code official, such diagram shall be posted.

[California Code of Regulations, Title 19, Division 1, §3.30] Posting of Room Capacity.

Any room having an occupant load of 50 or more persons where fixed seats are not installed, and which is used for assembly, classroom, dining, drinking or similar purposes, shall have the capacity of the room posted in a conspicuous place near the main exit from the room. Posting shall be by means of a durable sign having a contrasting color from the background to which it is attached. Signs shall be of an approved type and shall be maintained in a legible manner by the owner or his authorized agent and shall indicate the number of occupants permitted for each room use. No person shall deface or remove such signs except as authorized by the enforcing agency.

[BE] 1004.6 Fixed seating. For areas having fixed seats and aisles, the occupant load shall be determined by the number of fixed seats installed therein. The occupant load for areas in which fixed seating is not installed, such as waiting spaces, shall be determined in accordance with Section 1004.5 and added to the number of fixed seats.

The occupant load of wheelchair spaces and the associated companion seat shall be based on one occupant for each wheelchair space and one occupant for the associated companion seat provided in accordance with *Chapter 11B of the California Building Code.*

For areas having fixed seating without dividing arms, the occupant load shall be not less than the number of seats based on one person for each 18 inches (457 mm) of seating length.

The occupant load of seating booths shall be based on one person for each 24 inches (610 mm) of booth seat length measured at the backrest of the seating booth.

[BE] 1004.7 Outdoor areas. Yards, patios, occupiable roofs, courts and similar outdoor areas accessible to and usable by the building occupants shall be provided with means of egress as required by this chapter. The occupant load of such outdoor areas shall be assigned by the fire code official in accordance with the anticipated use. Where outdoor areas are to be used by persons in addition to the occupants of the building, and the path of egress travel from the outdoor areas passes through the building, means of egress requirements for the building shall be based on the sum of the occupant loads of the building plus the outdoor areas.

Exceptions:

1. Outdoor areas used exclusively for service of the building need only have one means of egress.
2. Both outdoor areas associated with Group R-3 and individual dwelling units of Group R-2.

[BE] 1004.8 Concentrated business use areas. The occupant load factor for concentrated business use shall be applied to telephone call centers, trading floors, electronic data entry centers and similar business use areas with a higher density of occupants than would normally be expected in a typical business occupancy environment. Where approved by the code official, the occupant load for concentrated business use areas shall be the actual occupant load, but not less than one occupant per 50 square feet (4.65 m^2) of gross occupiable floor space.

[BE] 1004.9 Posting of occupant load. Every room or space *which is used for assembly, classroom, dining, drinking or similar purposes having an occupant load of 50 or more* that is an assembly occupancy shall have the occupant load of the room or space posted in a conspicuous place, near the main exit or exit access doorway from the room or space, for the intended configurations. Posted signs shall be of an approved legible permanent design and shall be maintained by the owner or the owner's authorized agent.

SECTION 1005—MEANS OF EGRESS SIZING

[BE] 1005.1 General. All portions of the means of egress system shall be sized in accordance with this section.

Exception: Aisles and aisle accessways in rooms or spaces used for assembly purposes complying with Section 1030.

[BE] 1005.2 Minimum width based on component. The minimum width, in inches (mm), of any means of egress components shall be not less than that specified for such component, elsewhere in this code.

[BE] 1005.3 Required capacity based on occupant load. The required capacity, in inches (mm), of the means of egress for any room, area, space or story shall be not less than that determined in accordance with Sections 1005.3.1 and 1005.3.2.

[BE] 1005.3.1 Stairways. The capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairways by a means of egress capacity factor of 0.3 inch (7.6 mm) per occupant. Where stairways serve more than one story, only the occupant load of each story considered individually shall be used in calculating the required capacity of the stairways serving that story.

Exceptions:

1. For other than Group H and I-2 occupancies, the capacity, in inches, of means of egress stairways shall be calculated by multiplying the occupant load served by such stairways by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with smoke-protected assembly seating shall be permitted to use the capacity factors in Table 1030.6.2 indicated for stepped aisles for exit access or exit stairways where the entire path for means of egress from the seating to the exit discharge is provided with a smoke control system complying with Section 909.

3. Facilities with open-air assembly seating shall be permitted to the capacity factors in Section 1030.6.3 indicated for stepped aisles for exit access or exit stairways where the entire path for means of egress from the seating to the exit discharge is open to the outdoors.
4. *For Group H-1, H-2, H-3 and H-4 occupancies, the total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.7 inches (7.62 mm) per occupant.*

[BE] 1005.3.2 Other egress components. The capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.2 inch (5.1 mm) per occupant.

Exceptions:

1. For other than Group H and I-2 occupancies, the capacity, in inches, of means of egress components other than stairways shall be calculated by multiplying the occupant load served by such component by a means of egress capacity factor of 0.15 inch (3.8 mm) per occupant in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and an emergency voice/alarm communication system in accordance with Section 907.5.2.2.
2. Facilities with smoke-protected assembly seating shall be permitted to use the capacity factors in Table 1030.6.2indicated for level or ramped aisles for means of egress components other than stairways where the entire path for means of egress from the seating to the exit discharge is provided with a smoke control system complying with Section 909.
3. Facilities with open-air assembly seating shall be permitted to the capacity factors in Section 1030.6.3 indicated for level or ramped aisles for means of egress components other than stairways where the entire path for means of egress from the seating to the exit discharge is open to the outdoors.
4. *For Group H-1, H-2, H-3 and H-4 occupancies, the total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by 0.4 inches (5.08 mm) per occupant.*

[BE] 1005.4 Continuity. The minimum width or required capacity of the means of egress required from any story of a building shall not be reduced along the path of egress travel until arrival at the public way.

[BE] 1005.5 Distribution of minimum width and required capacity. Where more than one exit, or access to more than one exit, is required, the means of egress shall be configured such that the loss of any one exit, or access to one exit, shall not reduce the available capacity or width to less than 50 percent of the required capacity or width.

[BE] 1005.6 Egress convergence. Where the means of egress from stories above and below converge at an intermediate level, the capacity of the means of egress from the point of convergence shall be not less than the largest minimum width or the sum of the required capacities for the stairways or ramps serving the two adjacent stories, whichever is larger.

[BE] 1005.7 Encroachment. Encroachments into the required means of egress width shall be in accordance with the provisions of this section.

[BE] 1005.7.1 Doors. Doors, when fully opened, shall not reduce the required width by more than 7 inches (178 mm). Doors in any position shall not reduce the required width by more than one-half.

Exceptions:

1. *In other than Group I-2 occupancies,* surface-mounted latch release hardware shall be exempt from inclusion in the 7-inch maximum (178 mm) encroachment where both of the following conditions exists:
   1.1. The hardware is mounted to the side of the door facing away from the adjacent wall where the door is in the open position.
   1.2. The hardware is mounted not less than 34 inches (865 mm) nor more than 48 inches (1219 mm) above the finished floor.
2. The restrictions on door swing shall not apply to doors within individual dwelling units and sleeping units of Group R-2 occupancies and dwelling units of Group R-3 occupancies.

[BE] 1005.7.2 Other projections. Handrail projections shall be in accordance with the provisions of Section 1014.9. Other nonstructural projections such as trim and similar decorative features shall be permitted to project into the required width not more than $1^1/_2$ inches (38 mm) on each side.

[BE] 1005.7.3 Protruding objects. Protruding objects shall comply with the applicable requirements of Section 1003.3.

SECTION 1006—NUMBERS OF EXITS AND EXIT ACCESS DOORWAYS

[BE] 1006.1 General. The number of exits or exit access doorways required within the means of egress system shall comply with the provisions of Section 1006.2 for spaces, including mezzanines, and Section 1006.3 for stories or occupiable roofs.

[BE] 1006.2 Egress from spaces. Rooms, areas or spaces, including mezzanines, within a story or basement shall be provided with the number of exits or access to exits in accordance with this section.

[BE] 1006.2.1 Egress based on occupant load and common path of egress travel distance. Two exits or exit access doorways from any space shall be provided where the design occupant load or the common path of egress travel distance exceeds the

values listed in Table 1006.2.1. The cumulative occupant load from adjacent rooms, areas or spaces shall be determined in accordance with Section 1004.2.

Exceptions:

1. The number of exits from foyers, lobbies, vestibules or similar spaces need not be based on cumulative occupant loads for areas discharging through such spaces, but the capacity of the exits from such spaces shall be based on applicable cumulative occupant loads.
2. *Rooms and* care suites in Group I-2 occupancies complying with Section 407.4 of the *California Building Code*.
3. Unoccupied mechanical rooms and penthouses are not required to comply with the common path of egress travel distance measurement.
4. *In detention and correctional facilities and holding cells, such as are found in courthouse buildings, when the occupant load is more than 20 see Section 408.3.11 of the California Building Code.*

[BE] TABLE 1006.2.1—SPACES WITH ONE EXIT OR EXIT ACCESS DOORWAY

OCCUPANCY	MAXIMUM OCCUPANT LOAD OF SPACE	MAXIMUM COMMON PATH OF EGRESS TRAVEL DISTANCE (feet)		
		Without Automatic Sprinkler System (feet)		With Automatic Sprinkler System (feet)
		Occupant Load		
		OL ≤ 30	OL > 30	
A[c], E, M	49	75	75	75[a]
B	49	100	75	100[a]
F	49	75	75	100[a]
H-1, H-2, H-3	3	NP	NP	25[b]
H-4, H-5	10	NP	NP	75[b]
I-1, I-2[d], I-4	10	NP[i]	NP[i]	75[a]
I-3[h]	10	NP	NP	100[a]
L	*See Section 453.6.1 of the California Building Code*	*NP*	*NP*	*NP*
R-1	10	NP	NP	75[a]
R-2	20	NP	NP	125[a]
R-2.1	*10*	*NP*	*NP*	*75[a]*
R-2.2	*20*	*NP*	*NP*	*125[a]*
R-3[e], *R-3.1*[e]	20	NP	NP	125[a, g]
R-4[e]	20	NP	NP	125[a, g]
S[f]	29	100	75	100[a]
U	49	100	75	75[a]

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

a. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2

b. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.

c. For a room or space used for assembly purposes having fixed seating, see Section 1030.8.

d. For the travel distance limitations *and number of exit and exit access requirements for rooms and spaces in Group I-2, see Section 407.4 of the California Building Code.*

e. The common path of egress travel distance shall apply only in a Group R-3 occupancy located in a mixed occupancy building or within a Group R-3 or R-4 congregate living facility.

f. The length of common path of egress travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

g. For the travel distance limitations in Groups R-3 and R-4 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3, see Section 1006.2.2.6.

h. For holding cells, see Section 408.3.11 of the California Building Code.

i. In accordance with Health and Safety Code Section 13113(d), there is no requirement for automatic sprinkler protection in an existing Group I-2 located in Type IA construction.

[BE] 1006.2.1.1 Three or more exits or exit access doorways. Three exits or exit access doorways shall be provided from any space with an occupant load of 501 to 1,000. Four exits or exit access doorways shall be provided from any space with an occupant load greater than 1,000.

[BE] 1006.2.2 Egress based on use. The numbers, configuration and types of components of exits or access to exits shall be provided in the uses described in Sections 1006.2.2.1 through *1006.2.2.7*.

[BE] 1006.2.2.1 Boiler, incinerator and furnace rooms. Two exit access doorways are required in boiler, incinerator and furnace rooms where the area is over 500 square feet (46 m^2) and any fuel-fired equipment exceeds 400,000 British thermal units (Btu) (422 000 KJ) input capacity. Where two exit access doorways are required, one is permitted to be a fixed ladder or an

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alternating tread device. Exit access doorways shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.

[BE] 1006.2.2.2 Refrigeration machinery rooms. Machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two exits or exit access doorways. Where two exit access doorways are required, one such doorway is permitted to be served by a fixed ladder or an alternating tread device. Exit access doorways shall be separated by a horizontal distance equal to one-half the maximum horizontal dimension of the room.

Exit access travel distance shall be determined as specified in Section 1017.1, but all portions of a refrigeration machinery room shall be within 150 feet (45 720 mm) of an exit or exit access doorway where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigeration machinery rooms or adjoining refrigerated rooms or spaces.

Exit and exit access doorways shall swing in the direction of egress travel and shall be equipped with panic hardware, regardless of the occupant load served. Exit and exit access doorways shall be tight fitting and self-closing.

[BE] 1006.2.2.3 Refrigerated rooms or spaces. Rooms or spaces having a floor area larger than 1,000 square feet (93 m^2), containing a refrigerant evaporator and maintained at a temperature below 68°F (20°C), shall have access to not less than two exits or exit access doorways.

Exit access travel distance shall be determined as specified in Section 1017.1. *All* portions of a refrigerated room or space shall be within 150 feet (45 720 mm) of an exit or exit access doorway *leading to a nonrefrigerated area* where such rooms are not protected by an approved automatic sprinkler system. Egress is allowed through adjoining refrigerated rooms or spaces.

Exception: Where using refrigerants in quantities limited to the amounts based on the volume set forth in the *California Mechanical Code. Egress is allowed through adjoining refrigerated rooms or spaces.*

[BE] 1006.2.2.4 Electrical rooms. The location and number of exit or exit access doorways shall be provided for electrical rooms in accordance with Section 110.26 of *the California Electrical Code* for electrical equipment rated 1,000 volts or less, and Section 110.33 of *the California Electrical Code* for electrical equipment rated over 1,000 volts. Panic hardware shall be provided where required in accordance with Section 1010.2.8.2.

[BE] 1006.2.2.5 Vehicular ramps. Vehicular ramps shall not be considered as an exit access ramp unless pedestrian facilities are provided.

[BE] 1006.2.2.6 Groups R-3 and R-4. Where Group R-3 occupancies are permitted by Section 903.2.8 to be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.3, the exit access travel distance for Group R-3 shall be not more than 125 feet (38 100 mm). Where Group R-4 occupancies are permitted by Section 903.2.8 to be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.3, the exit access travel distance for Group R-4 shall be not more than 75 feet (22 860 mm).

1006.2.2.7 Large family day-care home. *Every story or basement of a large family day-care home shall be provided with two exits which are remotely located from each other. Every required exit shall be of a size to permit the installation of a door not less than 32 inches (813 mm) in clear width and not less than 6 feet 8 inches (2,032 mm) in height. A manually operated horizontal sliding door may be used as one of the two required exits.*

Where basements are used for day-care purposes, one of the two required exits shall provide access directly to the exterior without entering the first story. The second exit from the basement may either pass through the story above or exit directly to the exterior.

Rooms used for day-care purposes shall not be located above the first story.

Exception: *Buildings equipped with an automatic sprinkler system throughout and which have at least one of the required exits providing access directly to the exterior. NFPA 13R may be used in large family day-care homes. The sprinkler omissions of NFPA 13R shall not apply unless approved by the enforcing agency.*

Exit doors, including manually operated horizontal sliding doors, shall be openable from the inside without use of a key or any special knowledge or effort.

Tables 1006.3.3(1) and 1006.3.3(2) are not applicable to this occupancy classification.

1006.2.2.8 Group I-4 means of egress. *Group I-4 facilities, rooms or spaces where care is provided for more than 10 children that are 36 months of age or less shall have access to not less than two exits or exit access doorways.*

[BE] 1006.3 Egress from stories or occupiable roofs. All spaces located on a story or occupiable roof shall have access to the required number of separate and distinct exits or access to exits based on the aggregate occupant load served in accordance with this section.

[BE] 1006.3.1 Occupant load. Where stairways serve more than one story, or more than one story and an occupiable roof, only the occupant load of each story or occupiable roof, considered individually, shall be used when calculating the required number of exits or access to exits serving that story.

[BE] 1006.3.2 Path of egress travel. The path of egress travel to an exit shall not pass through more than one adjacent story.

Exception: The path of egress travel to an exit shall be permitted to pass through more than one adjacent story in any of the following:

1. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or fewer serving and contained within an individual dwelling unit or sleeping unit or live/work unit.

2. Exit access stairways serving and contained within a Group R-3 congregate residence or a Group R-4 facility.
3. Exit access stairways and ramps within an atrium complying with Section 404 of the *California Building Code*.
4. Exit access stairways and ramps in open parking garages that serve only the parking garage.
5. Exit access stairways and ramps serving smoke-protected assembly seating and open-air assembly seating complying with the exit access travel distance requirements of Section 1030.7.
6. Exit access stairways and ramps between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
7. Exterior exit access stairways and ramps between occupiable roofs.

[BE] 1006.3.3 Egress based on occupant load. Each story and occupiable roof shall have the minimum number of separate and distinct exits, or access to exits, as specified in Table 1006.3.3. A single exit or access to a single exit shall be permitted in accordance with Section 1006.3.4. The required number of exits, or exit access stairways or ramps providing access to exits, from any story or occupiable roof shall be maintained until arrival at the exit discharge or public way.

[BE] TABLE 1006.3.3—MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY OR OCCUPIABLE ROOFS

OCCUPANT LOAD PER STORY OR OCCUPIABLE ROOF	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY OR OCCUPIABLE ROOF
1–500	2
501–1,000	3
More than 1,000	4

[BE] 1006.3.4 Single exits. A single exit or access to a single exit shall be permitted from any story or occupiable roof, where one of the following conditions exists:

1. The occupant load, number of dwelling units and exit access travel distance do not exceed the values in Table 1006.3.4(1) or 1006.3.4(2).
2. Rooms, areas and spaces *at the level of exit discharge,* complying with Section 1006.2.1 with exits that discharge directly to the exterior at the level of exit discharge, are permitted to have one exit or access to a single exit.
3. Parking garages where vehicles are mechanically parked shall be permitted to have one exit or access to a single exit.
4. Group R-3 and R-4 occupancies shall be permitted to have one exit or access to a single exit.
5. Individual single-story or multistory dwelling units shall be permitted to have a single exit or access to a single exit from the dwelling unit provided that both of the following criteria are met:
   5.1. The dwelling unit complies with Section 1006.2.1 as a space with one means of egress.
   5.2. Either the exit from the dwelling unit discharges directly to the exterior at the level of exit discharge, or the exit access outside the dwelling unit's entrance door provides access to not less than two approved independent exits.

[BE] TABLE 1006.3.4(1)—STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR R-2 *AND R-3* OCCUPANCIES

STORY	OCCUPANCY	MAXIMUM NUMBER OF DWELLING UNITS	MAXIMUM EXIT ACCESS TRAVEL DISTANCE
Basement, first, second or third story above grade plane and occupiable roofs over the first or second story above grade plane	R-2[a, b, c] *R-3*[a]	4 dwelling units *NA*	125 feet *NA*
Fourth story above grade plane and higher	*R-3*[a]	NA	*125 feet*

For SI: 1 foot = 304.8 mm.
NP = Not Permitted.
NA = Not Applicable.
a. Buildings classified as Group R-2 *or R-3* equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.
b. This table is used for Group R-2 occupancies consisting of dwelling units. For Group R-2 occupancies consisting of sleeping units, use Table 1006.3.4(2).
c. This table is for occupiable roofs accessed through and serving individual dwelling units in Group R-2 occupancies. For Group R-2 occupancies with occupiable roofs that are not accessed through and serving individual units, use Table 1006.3.4(2).

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[BE] TABLE 1006.3.4(2)—STORIES AND OCCUPIABLE ROOFS WITH ONE EXIT OR ACCESS TO ONE EXIT FOR OTHER OCCUPANCIES

STORY AND OCCUPIABLE ROOF	OCCUPANCY[e]	MAXIMUM OCCUPANT LOAD PER STORY AND OCCUPIABLE ROOF	MAXIMUM EXIT ACCESS TRAVEL DISTANCE (feet)
First story above or below grade plane and occupiable roofs over the first story above grade plane	A, B[b], E, F[b], M, U	49	75
	H-2, H-3	3	25
	H-4, H-5, I, R-1, R-2[a, c], *R-2.2*	10	75
	S[b, d]	29	75
	I-2	*7 occupants*	*50 feet*
Second story above grade plane	B, F, M, S[d]	29	75
Third story above grade plane and higher	NP	NA	NA

For SI: 1 foot = 304.8 mm.

NP = Not Permitted.

NA = Not Applicable.

a. Buildings classified as Group R-2 equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 and provided with emergency escape and rescue openings in accordance with Section 1031.

b. Group B, F and S occupancies in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or an occupiable roof of such buildings shall have a maximum exit access travel distance of 100 feet.

c. This table is used for Group R-2 occupancies consisting of sleeping units. For Group R-2 occupancies consisting of dwelling units, use Table 1006.3.4(1).

d. The length of exit access travel distance in a Group S-2 open parking garage shall be not more than 100 feet.

e. *For Group L occupancies see Section 453.6.1 of the California Building Code.*

[BE] 1006.3.4.1 Mixed occupancies. Where one exit, or exit access stairway or ramp providing access to exits at other stories, is permitted to serve individual stories, mixed occupancies shall be permitted to be served by single exits provided that each individual occupancy complies with the applicable requirements of Table 1006.3.4(1) or 1006.3.4(2) for that occupancy. Where applicable, cumulative occupant loads from adjacent occupancies shall be considered to be in accordance with the provisions of Section 1004.1. In each story of a mixed occupancy building, the maximum number of occupants served by a single exit shall be such that the sum of the ratios of the calculated number of occupants of the space divided by the allowable number of occupants indicated in Table 1006.3.4(2) for each occupancy does not exceed one. Where dwelling units are located on a story with other occupancies, the actual number of dwelling units divided by four plus the ratio from the other occupancy does not exceed one.

SECTION 1007—EXIT AND EXIT ACCESS DOORWAY CONFIGURATION

[BE] 1007.1 General. Exits, exit access doorways, and exit access stairways and ramps serving spaces, including individual building stories, shall be separated in accordance with the provisions of this section.

[BE] 1007.1.1 Two exits or exit access doorways. Where two exits, exit access doorways, exit access stairways or ramps, or any combination thereof, are required from any portion of the exit access, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between them. Interlocking or scissor stairways shall be counted as one exit stairway.

Exceptions:

1. Where interior exit stairways or ramps are interconnected by a 1-hour fire-resistance-rated corridor conforming to the requirements of Section 1020, the required exit separation shall be measured along the shortest direct line of travel within the corridor.
2. Where a building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2, the separation distance shall be not less than one-third of the length of the maximum overall diagonal dimension of the area served.

[BE] 1007.1.1.1 Measurement point. The separation distance required in Section 1007.1.1 shall be measured in accordance with the following:

1. The separation distance to exit or exit access doorways shall be measured to any point along the width of the doorway.
2. The separation distance to exit access stairways shall be measured to the closest riser.
3. The separation distance to exit access ramps shall be measured to the start of the ramp run.

[BE] 1007.1.2 Three or more exits or exit access doorways. Where access to three or more exits is required, not less than two exit or exit access doorways shall be arranged in accordance with the provisions of Section 1007.1.1. Additional required exit or exit access doorways shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available.

[BE] 1007.1.3 Remoteness of exit access stairways or ramps. Where two exit access stairways or ramps provide the required means of egress to exits at another story, the required separation distance shall be maintained for all portions of such exit access stairways or ramps.

[BE] 1007.1.3.1 Three or more exit access stairways or ramps. Where more than two exit access stairways or ramps provide the required means of egress, not less than two shall be arranged in accordance with Section 1007.1.3.

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SECTION 1008—MEANS OF EGRESS ILLUMINATION

[BE] 1008.1 Means of egress illumination. Illumination shall be provided in the means of egress in accordance with Section 1008.2. In the event of power supply failure, means of egress illumination shall comply with Section 1008.3.

[BE] 1008.2 Illumination required. The means of egress serving a room or space shall be illuminated at all times that the room or space is occupied.

Exceptions:

1. Occupancies in Group U.
2. Self-service storage units 400 square feet (37.2 m^2) or less in area and accessed directly from the exterior of the building.
3. Aisle accessways in Group A.
4. Dwelling units and sleeping units in Groups R-1, R-2 and R-3.
5. Sleeping units of Group I, *R-2.1 and R-4* occupancies.

[BE] 1008.2.1 Illumination level under normal power. The means of egress illumination level shall be not less than 1 footcandle (11 lux) at the walking surface. Along exit access stairways, exit stairways and at their required landings, the illumination level shall be not less than 10 footcandles (108 lux) at the walking surface when the stairway is in use.

Exception: For auditoriums, theaters, concert or opera halls and similar assembly occupancies, the illumination at the walking surface is permitted to be reduced during performances by one of the following methods provided that the required illumination is automatically restored upon activation of a premises' fire alarm system:

1. Externally illuminated walking surfaces shall be permitted to be illuminated to not less than 0.2 footcandle (2.15 lux).
2. Steps, landings and the sides of ramps shall be permitted to be marked with self-luminous materials in accordance with Sections 1025.2.1, 1025.2.2 and 1025.2.4 by systems listed in accordance with UL 1994.

[BE] 1008.2.2 Group I-2. In Group I-2 occupancies where two or more exits are required, on the exterior landings required by Section 1010.1.5, means of egress illumination levels for the exit discharge shall be provided such that failure of a single lamp in a luminaire shall not reduce the illumination level on that landing to less than 1 footcandle (11 lux).

[BE] 1008.2.3 Exit discharge. Illumination shall be provided along the path of travel for the exit discharge from each exit to the public way.

Exception: Illumination shall not be required where the path of the exit discharge meets both of the following requirements:

1. The path of exit discharge is illuminated from the exit to a safe dispersal area complying with Section 1028.5.
2. A dispersal area shall be illuminated to a level not less than 1 footcandle (11 lux) at the walking surface.

[BE] 1008.2.4 Power for illumination. The power supply for means of egress illumination shall normally be provided by the premises' electrical supply.

[BE] 1008.3 Illumination required by an emergency electrical system. An emergency electrical system shall be provided to automatically illuminate the following areas in the event of a power supply failure:

1. In rooms or spaces that require two or more exits or access to exits:
   - 1.1. Aisles.
   - 1.2. Corridors.
   - 1.3. Exit access stairways and ramps.
2. In buildings that require two or more exits or access to exits:
   - 2.1. Interior exit access stairways and ramps.
   - 2.2. Interior and exterior exit stairways and ramps.
   - 2.3. Exit passageways.
   - 2.4. Vestibules and areas on the level of discharge used for exit discharge in accordance with Section 1028.2.
   - 2.5. Exterior landings as required by Section 1010.1.5 for exit doorways that lead directly to the exit discharge.
3. In other rooms and spaces:
   - 3.1. Electrical equipment rooms.
   - 3.2. Fire command centers.
   - 3.3. Fire pump rooms.
   - 3.4. Generator rooms.
   - 3.5. Public restrooms with an area greater than 300 square feet (27.87 m^2).
4. *Group I-2 exit discharge stairways, ramps, aisles, walkways and escalators leading to a public way or to a safe dispersal area in accordance with Section 1028.5.*

[BE] 1008.3.1 Duration. The emergency power system shall provide power for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 2702 of the *California Building Code*.

[BE] 1008.3.2 Illumination level under emergency power. Emergency lighting facilities shall be arranged to provide initial illumination that is not less than an average of 1 footcandle (11 lux) and a minimum at any point of 0.1 footcandle (1 lux) measured

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along the path of egress at floor level. Illumination levels shall be permitted to decline to 0.6 footcandle (6 lux) average and a minimum at any point of 0.06 footcandle (0.6 lux) at the end of the emergency lighting time duration. A maximum-to-minimum illumination uniformity ratio of 40 to 1 shall not be exceeded. In Group I-2 occupancies, failure of a single lamp in a luminaire shall not reduce the illumination level to less than 0.2 footcandle (2.2 lux).

SECTION 1009—ACCESSIBLE MEANS OF EGRESS

[BE] 1009.1 Accessible means of egress required. Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress is required by Section 1006.2 or 1006.3 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress *in at least the same number as required by Section 1006.2 or 1006.3. In addition to the requirements of this chapter, means of egress, which provide access to, or egress from, buildings for persons with disabilities, shall also comply with the requirements of Chapter 11A or 11B of the California Building Code, as applicable.*

Exceptions:

1. One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1009.3, 1009.4 or 1009.5 *and Chapter 11A or 11B of the California Building Code.*
2. In assembly areas with ramped aisles or stepped aisles, one accessible means of egress is permitted where the common path of travel is accessible and meets the requirements in Section 1030.8 *and Chapter 11A or 11B of the California Building Code.*

[BE] 1009.2 Continuity and components. Each required accessible means of egress shall be continuous to a public way and shall consist of one or more of the following components:

1. Accessible routes complying with *and Chapter 11A or 11B of the California Building Code.*
2. Interior exit stairways complying with Sections 1009.3 and 1023 *of this code and Chapter 11A or 11B of the California Building Code.*
3. Exit access stairways complying with Sections 1009.3 and 1019.3 or 1019.4 *of this code and Chapter 11A or 11B of the California Building Code.*
4. Exterior exit stairways complying with Sections 1009.3 and 1027 and serving levels other than the level of exit discharge *of this code and Chapter 11A or 11B of the California Building Code.*
5. Elevators complying with Section 1009.4 *of this code and Chapter 11A or 11B of the California Building Code.*
6. Platform lifts complying with Section 1009.5 *of this code and Chapter 11A or 11B of the California Building Code.*
7. Horizontal exits complying with Section 1026.
8. Ramps complying with Section 1012 *of this code and Chapter 11A or 11B of the California Building Code.*
9. Areas of refuge complying with Section 1009.6.
10. Exterior areas for assisted rescue complying with Section 1009.7 serving exits at the level of exit discharge.

[BE] 1009.2.1 Elevators required. In buildings where a required accessible floor is four or more stories above or below a level of exit discharge or where an accessible occupiable roof is above a story that is three or more stories above the level of exit discharge, not less than one required accessible means of egress shall include an elevator complying with Section 1009.4.

Exceptions:

1. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the accessible means of egress on floors provided with a horizontal exit and located at or above the levels of exit discharge.
2. In buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the elevator shall not be required as part of the accessible means of egress on floors or occupiable roofs provided with a ramp conforming to the provisions of Section 1012.

[BE] 1009.2.2 Doors. Where doors are part of an accessible route to provide access to an exit area of refuge or exterior area of assisted rescue, maneuvering clearances shall be provided at such doors as required by ICC A117.1 in the direction of egress. Where doors lead to an area of refuge or exterior area for assisted rescue and reentry to the floor is possible, door maneuvering clearances shall be provided on both sides of the door.

Exception: Maneuvering clearances are not required at doors to exit stairways for levels above and below the level of exit discharge where the exit enclosure does not include an area of refuge.

[BE] 1009.3 Stairways. In order to be considered part of an accessible means of egress, a stairway between stories shall comply with Sections 1009.3.1 through 1009.3.3.

[BE] 1009.3.1 Exit access stairways. Exit access stairways that connect levels in the same story are not permitted as part of an accessible means of egress.

Exception: Exit access stairways providing means of egress from mezzanines are permitted as part of an accessible means of egress.

[BE] 1009.3.2 Stairway width. Stairways shall have a clear width of 48 inches (1219 mm) minimum between handrails.

Exceptions:

1. The clear width of 48 inches (1219 mm) between handrails is not required in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
2. The clear width of 48 inches (1219 mm) between handrails is not required for stairways accessed from a refuge area in conjunction with a horizontal exit.

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[BE] 1009.3.3 Area of refuge. Stairways shall either incorporate an area of refuge within an enlarged floor-level landing or shall be accessed from an area of refuge complying with Section 1009.6.

Exceptions:

1. Areas of refuge are not required at exit access stairways where two-way communication is provided at the elevator landing in accordance with Section 1009.8.
2. Areas of refuge are not required at stairways in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Areas of refuge are not required at stairways serving open parking garages.
4. Areas of refuge are not required for smoke-protected or open-air assembly seating areas complying with Sections 1030.6.2 and 1030.6.3.
5. Areas of refuge are not required at stairways in Group R-2 occupancies.
6. Areas of refuge are not required for stairways accessed from a refuge area in conjunction with a horizontal exit.

[BE] 1009.4 Elevators. In order to be considered part of an accessible means of egress, an elevator shall comply with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

[BE] 1009.4.1 Standby power. The elevator shall meet the emergency operation and signaling device requirements of *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders*. Standby power shall be provided in accordance with Chapter 27 and Section 3003 of the *California Building Code*.

[BE] 1009.4.2 Area of refuge. The elevator shall be accessed from an area of refuge complying with Section 1009.6.

Exceptions:

1. Areas of refuge are not required at the elevator in open parking garages.
2. Areas of refuge are not required in buildings and facilities equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Areas of refuge are not required at elevators not required to be located in a shaft in accordance with Section 712 of the *California Building Code*.
4. Areas of refuge are not required at elevators serving smoke protected or open-air assembly seating areas complying with Sections 1030.6.2 and 1030.6.3.
5. Areas of refuge are not required for elevators accessed from a refuge area in conjunction with a horizontal exit.

[BE] 1009.5 Platform lifts. Platform lifts shall be permitted to serve as part of an accessible means of egress where allowed as part of a required accessible route in *Chapter 11B* of the *California Building Code* except for Item 10. Standby power for the platform lift shall be provided in accordance with Chapter 27 of the *California Building Code*.

[BE] 1009.6 Areas of refuge. Every required area of refuge shall be accessible from the space it serves by an accessible means of egress.

[BE] 1009.6.1 Travel distance. The maximum travel distance from any accessible space to an area of refuge shall not exceed the exit access travel distance permitted for the occupancy in accordance with Section 1017.1.

[BE] 1009.6.2 Stairway or elevator access. Every required area of refuge shall have direct access to a stairway complying with Sections 1009.3 and 1023 or an elevator complying with Section 1009.4.

Exception: An interior area of refuge at the level of exit discharge that provides direct access to an exterior exit door.

[BE] 1009.6.3 Size. Each area of refuge shall be sized to accommodate *two* wheelchair space*s that are not less than* of 30 inches by 52 inches (762 mm by 1321 mm) for each 200 occupants or portion thereof, based on the occupant load of the area of refuge and areas served by the area of refuge. *The total number of such 30-inch by 52-inch (762 mm by 1320 mm) spaces per story shall be not less than one for every 200 persons of calculated occupant load served by the area of refuge.* Such wheelchair spaces shall not reduce the means of egress minimum width or required capacity. Access to any of the required wheelchair spaces in an area of refuge shall not be obstructed by more than one adjoining wheelchair space.

Exception: *The enforcing agency may reduce the size of each required area of refuge to accommodate one wheelchair space that is not less than 30 inches by 52 inches (762 mm by 1320 mm) on floors where the occupant load is less than 200.*

[BE] 1009.6.4 Separation. Each area of refuge shall be separated from the remainder of the story by a smoke barrier complying with Section 709 of the *California Building Code* or a horizontal exit complying with Section 1026. Each area of refuge shall be designed to minimize the intrusion of smoke.

Exceptions:

1. Areas of refuge located within an enclosure for interior exit stairways complying with Section 1023.
2. Areas of refuge in outdoor facilities where exit access is essentially open to the outside.

[BE] 1009.6.5 Two-way communication. Areas of refuge shall be provided with a two-way communication system complying with Sections 1009.8.1 and 1009.8.2.

[BE] 1009.7 Exterior areas for assisted rescue. Exterior areas for assisted rescue shall be accessed by an accessible route from the area served.

Where the exit discharge does not include an accessible route from an exit located on the level of exit discharge to a public way, an exterior area of assisted rescue shall be provided on the exterior landing in accordance with Sections 1009.7.1 through 1009.7.4.

[BE] 1009.7.1 Size. Each exterior area for assisted rescue shall be sized to accommodate wheelchair spaces in accordance with Section 1009.6.3.

[BE] 1009.7.2 Separation. Exterior walls separating the exterior area of assisted rescue from the interior of the building shall have a minimum fire-resistance rating of 1 hour, rated for exposure to fire from the inside. The fire-resistance-rated exterior wall construction shall extend horizontally not less than 10 feet (3048 mm) beyond the landing on either side of the landing or equivalent fire-resistance-rated construction is permitted to extend out perpendicular to the exterior wall not less than 4 feet (1219 mm) on the side of the landing. The fire-resistance-rated construction shall extend vertically from the ground to a point not less than 10 feet (3048 mm) above the floor level of the area for assisted rescue or to the roof line, whichever is lower. Openings within such fire-resistance-rated exterior walls shall be protected in accordance with Section 716 of the *California Building Code*.

Exception: The fire-resistance rating and opening protectives are not required in the exterior wall where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[BE] 1009.7.3 Openness. The exterior area for assisted rescue shall be open to the outside air. The sides other than the separation walls shall be not less than 50 percent open, and the open area shall be distributed so as to minimize the accumulation of smoke or toxic gases.

[BE] 1009.7.4 Stairways. *S*tairways that are part of the means of egress for the exterior area for assisted rescue shall provide a minimum clear width of 48 inches (1219 mm) between handrails.

Exception: The minimum clear width of 48 inches (1219 mm) between handrails is not required at stairways serving buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[BE] 1009.8 Two-way communication. A two-way communication system complying with Sections 1009.8.1 and 1009.8.2 shall be provided at the landing serving each elevator or bank of elevators on each accessible floor that is one or more stories above or below the level of exit discharge.

Exceptions:

1. Two-way communication systems are not required at the landing serving each elevator or bank of elevators where the two-way communication system is provided within areas of refuge in accordance with Section 1009.6.5.
2. Two-way communication systems are not required on floors provided with ramps conforming to the provisions of Section 1012.
3. Two-way communication systems are not required at the landings serving only service elevators that are not designated as part of the accessible means of egress or serve as part of the required accessible route into a facility.
4. Two-way communication systems are not required at the landings serving only freight elevators.
5. Two-way communication systems are not required at the landing serving a private residence elevator.
6. Two-way communication systems are not required in Group I-2 or I-3 facilities.

[BE] 1009.8.1 System requirements. Two-way communication systems shall provide communication between each required location and the fire command center or a central control point location approved by the fire department. Where the central control point is not a constantly attended location, the two-way communication system shall have a timed automatic telephone dial-out capability that provides two-way communication with an approved supervising station or emergency services. The two-way communication system shall include both audible and visible signals. Systems shall be listed in accordance with UL 2525 and installed in accordance with NFPA 72.

[BE] 1009.8.2 Directions. Directions for the use of the two-way communication system, instructions for summoning assistance via the two-way communication system and written identification of the location shall be posted adjacent to the two-way communication system. Signage shall comply with *Chapter 11A, Section 1143A of the California Building Code* requirements for visual characters.

[BE] 1009.9 Signage. Signage indicating special accessibility provisions shall be provided as shown:

1. Each door providing access to an area of refuge from an adjacent floor area shall be identified by a sign stating: “AREA OF REFUGE.”
2. Each door providing access to an exterior area for assisted rescue shall be identified by a sign stating: “EXTERIOR AREA FOR ASSISTED RESCUE.”

Signage shall comply with the ICC A117.1 requirements for visual characters and include the International Symbol of Accessibility. Where exit sign illumination is required by Section 1013.3, the signs shall be illuminated. Additionally, visual characters, raised character and braille signage complying with ICC A117.1 shall be located at each door to an area of refuge and exterior area for assisted rescue in accordance with Section 1013.4.

[BE] 1009.10 Directional signage. Directional signage *complying with Chapter 11B, Section 11B-703.5,* indicating the location of all other means of egress and which of those are accessible means of egress shall be provided at the following:

1. At exits serving a required accessible space but not providing an approved accessible means of egress.
2. At elevator landings.
3. Within areas of refuge.

[BE] 1009.11 Instructions. In areas of refuge, exterior areas for assisted rescue and locations required to provide two-way communications systems complying with Section 1009.8, instructions on the use of the area under emergency conditions shall be posted. Signage shall comply with the ICC A117.1 requirements for visual characters. The instructions shall include all of the following:

1. Persons able to use the exit stairway do so as soon as possible, unless they are assisting others.

2. Information on planned availability of assistance in the use of stairs or supervised operation of elevators and how to summon such assistance.
3. Directions for use of the two-way communication system where provided.

1009.12 Alarms and emergency warning systems and two-way communication systems. *Required emergency warning systems shall activate a means of warning the hearing impaired. Emergency warning systems provided as part of the fire-alarm system and two-way communication systems required by Chapter 10 shall be designed and installed in accordance with NFPA 72 as amended in Chapter 80.*

SECTION 1010—DOORS, GATES AND TURNSTILES

[BE] 1010.1 Doors. Doors in the means of egress shall comply with the requirements of Sections 1010.1.1 through 1010.3.4. Exterior exit doors shall also comply with the requirements of Section 1022.2. Gates in the means of egress shall comply with the requirements of Sections 1010.4 and 1010.4.1. Turnstiles in the means of egress shall comply with the requirements of Sections 1010.5 through 1010.5.4.

Doors, gates and turnstiles provided for egress purposes in numbers greater than required by this code shall comply with the requirements of this section.

Doors in the means of egress shall be readily distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Mirrors or similar reflecting materials shall not be used on means of egress doors. Means of egress doors shall not be concealed by curtains, drapes, decorations or similar materials.

[BE] 1010.1.1 Size of doors. The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of 32 inches (813 mm). The clear opening width of doorways with swinging doors shall be measured between the face of the door and the frame stop, with the door open 90 degrees (1.57 rad). Where this section requires a minimum clear opening width of 32 inches (813 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 32 inches (813 mm). In Group I-2 *or an ambulatory care facility*, doors serving as means of egress doors where used for the movement of beds *and stretcher patients* shall provide a minimum clear opening width of *44 inches (1118 mm). Where this section requires a minimum clear opening width of 44 inches (1118 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 44 inches (1118 mm).* The minimum clear opening height of doors shall be not less than 80 inches (2032 mm).

Exceptions:

1. In Group R-2 and R-3 dwelling and sleeping units that are not required to be an Accessible unit, Type A unit or Type B unit, the minimum width shall not apply to door openings that are not part of the required means of egress.
2. Group I-3 door openings to resident sleeping units that are not required to be an Accessible unit shall have a minimum clear opening width of 28 inches (711 mm).
3. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
4. Door openings within a dwelling unit or sleeping unit shall have a minimum clear opening height of 78 inches (1981 mm).
5. In dwelling and sleeping units that are not required to be Accessible, Type A or Type B units, exterior door openings, other than the required exit door, shall have a minimum clear opening height of 76 inches (1930 mm).
6. In Groups R-2, R-3 and R-4, in dwelling and sleeping units that are not required to be Accessible, Type A or Type B units, the minimum clear opening widths shall not apply to interior egress doors.
7. Door openings required to be accessible within Type B units intended for user passage shall have a minimum clear opening width of 31.75 inches (806 mm).
8. Doors serving sauna compartments, toilet compartments or dressing, fitting or changing rooms compartments that are not required to be accessible shall have a minimum clear opening width of 20 inches (508 mm).
9. Doors serving shower compartments shall comply with Section 421.4.2 of the *California Plumbing Code*.

[BE] 1010.1.1.1 Projections into clear opening. There shall not be projections into the required clear opening width lower than 34 inches (864 mm) above the floor or ground. Projections into the clear opening width between 34 inches (864 mm) and 80 inches (2032 mm) above the floor or ground shall not exceed 4 inches (102 mm).

Exceptions:

1. Door closers, overhead doorstops, frame stops, power door operators, and electromagnetic door locks shall project into the door opening height not lower than 78 inches (1980 mm) above the floor.
2. *In a Group I-2 occupancy, there shall be no projections into the clear width of doors used for the movement of beds and stretcher patients in the means of egress.*

[BE] 1010.1.2 Egress door types. Egress doors shall be of the side-hinged swinging door, pivoted door or balanced door types.

Exceptions:

1. Private garages, office areas, factory and storage areas with an occupant load of 10 or less.
2. Group I-3 occupancies used as a place of detention.
3. Critical or intensive care patient rooms within suites of health care facilities.
4. Doors within or serving a single dwelling unit in Groups R-2 and R-3.

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5. In other than Group H occupancies, revolving doors complying with Section 1010.3.1.
6. In other than Group H occupancies, special-purpose horizontal sliding, accordion or folding door assemblies complying with Section 1010.3.3.
7. Power-operated doors in accordance with Section 1010.3.2.
8. Doors serving a bathroom within an individual dwelling unit or sleeping unit in Group R-1.
9. In other than Group H occupancies, manually operated horizontal sliding doors are permitted in a means of egress from spaces with an occupant load of 10 or less.
10. *In Group I-2 occupancies, exit doors serving an occupant load of 50 or more shall not be of the pivoted or balanced type.*

[BE] 1010.1.2.1 Direction of swing. Side-hinged swinging doors, pivoted doors and balanced doors shall swing in the direction of egress travel where serving a room or area containing an occupant load of 50 or more persons or a Group H occupancy. *For Group L occupancies, see Section 453.6.2 of the California Building Code.*

In a Group I-2 occupancy, all required exterior egress doors shall open in the direction of egress regardless of the occupant load served.

[BE] 1010.1.3 Forces to unlatch and open doors. The forces to unlatch doors shall comply with the following:

1. Where door hardware operates by push or pull, the operational force to unlatch the door shall not exceed 15 pounds (66.7 N).
2. Where door hardware operates by rotation, the operational force to unlatch the door shall not exceed 28 inch-pounds (315 N-cm).

The force to open doors shall comply with the following:

1. For interior swinging egress doors that are manually operated, other than doors required to be fire rated, the force for pushing or pulling open the door shall not exceed 5 pounds (22 N).
2. For other swinging doors, sliding doors or folding doors, and doors required to be fire rated, the door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force.

[BE] 1010.1.3.1 Location of applied forces. Forces shall be applied to the latch side of the door.

[BE] 1010.1.3.2 Manual horizontal sliding doors. Where a manual horizontal sliding door is required to latch, the latch or other mechanism shall prevent the door from rebounding into a partially open position when the door is closed.

[BE] 1010.1.4 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. At doors serving individual dwelling units or sleeping units in Groups R-2 and R-3, a door is permitted to open at the top step of an interior flight of stairs, provided that the door does not swing over the top step.
2. At exterior doors serving Groups F, H, R-2 and S and where such doors are not part of an accessible route *or are not required to be accessible by Chapter 11A or 11B of the California Building Code*, the landing at an exterior door shall be not more than 7 inches (178 mm) below the landing on the egress side of the door, provided that the door, other than an exterior storm or screen door, does not swing over the landing.
3. At exterior doors serving Group U and individual dwelling units and sleeping units in Groups R-2 and R-3, and where such units are not required to be Accessible units, Type A units or Type B units, the landing at an exterior doorway shall be not more than $7^3/_4$ inches (197 mm) below the landing on the egress side of the door. Such doors, including storm or screen doors, shall be permitted to swing over either landing.
4. Variations in elevation due to differences in finish materials, but not more than $^1/_2$ inch (12.7 mm).
5. Exterior decks, patios or balconies that are part of Type B dwelling units or sleeping units, that have impervious surfaces and that are not more than 4 inches (102 mm) below the finished floor level of the adjacent interior space of the dwelling unit or sleeping unit.
6. Doors serving equipment spaces not required to be accessible in accordance with Section 1103.2.9 of the *California Building Code* and serving an occupant load of five or less shall be permitted to have a landing on one side to be not more than 7 inches (178 mm) above or below the landing on the egress side of the door.

[BE] 1010.1.5 Landings at doors. Landings shall have a width not less than the width of the stairway or the door, whichever is greater. Doors in the fully open position shall not reduce a required dimension by more than 7 inches (178 mm). Where a landing serves an occupant load of 50 or more, doors in any position shall not reduce the landing to less than one-half its required width. Landings shall have a length measured in the direction of travel of not less than 44 inches (1118 mm).

Exception: Landing length in the direction of travel in Groups R-3 and U and within individual units of Group R-2 need not exceed 36 inches (914 mm).

[BE] 1010.1.6 Thresholds. Thresholds at doorways shall not exceed $^3/_4$ inch (19.1 mm) in height above the finished floor or landing for sliding doors serving dwelling units or $^1/_2$ inch (12.7 mm) above the finished floor or landing for other doors. Raised

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thresholds and floor level changes greater than $^1/_4$ inch (6.4 mm) at doorways shall be beveled with a slope not greater than 1 unit vertical in 2 units horizontal (50-percent slope).

Exceptions:

1. In occupancy Group R-2 or R-3, threshold heights for sliding and side-hinged exterior doors shall be permitted to be up to $7^3/_4$ inches (197 mm) in height if all of the following apply:
   1.1. The door is not part of the required means of egress.
   1.2. The door is not part of an accessible route as required by Chapter *11A or 11B* of the *California Building Code*.
   1.3. The door is not part of an *adaptable or accessible dwelling unit.*
2. In *adaptable or accessible dwelling* units, where Exception 5 to Section 1010.1.4 permits a 4-inch (102 mm) elevation change at the door, the threshold height on the exterior side of the door shall not exceed $4^3/_4$ inches (120 mm) in height above the exterior deck, patio or balcony for sliding doors or $4^1/_2$ inches (114 mm) above the exterior deck, patio or balcony for other doors.

[BE] 1010.1.7 Door arrangement. Space between two doors in a series shall be 48 inches (1219 mm) minimum plus the width of a door swinging into the space. Doors in a series shall swing either in the same direction or away from the space between the doors.

Exceptions:

1. The minimum distance between horizontal sliding power-operated doors in a series shall be 48 inches (1219 mm).
2. Storm and screen doors serving individual dwelling units in Groups R-2 and R-3 need not be spaced 48 inches (1219 mm) from the other door.
3. Doors within individual dwelling units in Groups R-2 and R-3 other than *adaptable or accessible dwelling units.*

[BE] 1010.2 Door operations. Except as specifically permitted by this section, egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort.

[BE] 1010.2.1 Unlatching. The unlatching of any door or leaf for egress shall require not more than one motion in a single linear or rotational direction to release all latching and all locking devices. locking devices. Manual bolts are not permitted.

Exceptions:

1. Places of detention or restraint.
2. Doors with manual bolts, automatic flush bolts and constant latching bolts as permitted by Section 1010.2.4, Item 4.
3. Doors from individual dwelling units and sleeping units of Group R occupancies as permitted by Section 1010.2.4, Item 5.

[BE] 1010.2.2 Hardware. Door handles, pulls, latches, locks and other operating devices on doors required to be accessible by Chapter *11A or 11B* of the *California Building Code* shall not require tight grasping, tight pinching or twisting of the wrist to operate.

These design requirements for door handles, pulls, latches, locks and other operating devices, intended for use on required means of egress doors in other than Group R and M occupancies with an occupant load of 10 or less, shall comply with SFM Standard 12-10-2, Section 12-10-202, contained in the CCR, Title 24, Part 12, California Referenced Standards Code.

[BE] 1010.2.3 Hardware height. Door handles, pulls, latches, locks and other operating devices shall be installed 34 inches (864 mm) minimum and 48 inches (1219 mm) maximum above the finished floor.

Exceptions:

1. Locks used only for security purposes and not used for normal operation are permitted at any height.
2. Where the *California Building Code* requires restricting access to a pool, spa or hot tub, and where door and gate latch release mechanisms are accessed from the outside of the barrier and are not of the self-locking type, such a mechanism shall be located above the finished floor or ground surface, not less than 52 inches (1219 mm) and not greater than 54 inches (1370 mm), provided that the latch release mechanism is not a self-locking type such as where the lock is operated by means of a key, electronic opener or the entry of a combination into an integral combination lock.

[BE] 1010.2.4 Locks and latches. Locks and latches shall be permitted to prevent operation of doors where any of the following exist:

1. Places of detention or restraint.
2. In Group *R-2.1* and Group I-2 occupancies where the clinical needs of persons receiving care require containment or where persons receiving care pose a security threat, provided that all clinical staff can readily unlock doors at all times, and all such locks are keyed to keys carried by all clinical staff at all times or all clinical staff have the codes or other means necessary to operate the locks at all times.
3. In buildings in occupancy Group A having an occupant load of 300 or less, Groups B, F, M and S, and in places of religious worship, the main door or doors are permitted to be equipped with key-operated locking devices from the egress side provided that:
   3.1. The doors are the main exterior doors to the building, or the doors are the main doors to the tenant space.
   3.2. The locking device is readily distinguishable as locked.
   3.3. A readily visible durable sign is posted on the egress side on or adjacent to the door stating: “THIS DOOR TO REMAIN UNLOCKED WHEN THIS SPACE IS OCCUPIED.” The sign shall be in letters 1 inch (25 mm) high on a contrasting background.

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3.4. The use of the key-operated locking device is revocable by the fire code official for due cause.

4. Manual bolts, automatic flush bolts and constant latching bolts on the inactive leaf of a pair of doors in accordance with Table 1010.2.4, provided that the inactive leaf does not have a doorknob, panic hardware, or similar operating hardware.
5. Single exit doors complying with Section 1006.2.1 or 1006.3.4 from individual dwelling or sleeping units of Group R occupancies and equipped with a night latch, dead bolt or security chain that requires a second releasing motion, provided that such devices are openable from the inside without the use of a key or tool.
6. Fire doors after the minimum elevated temperature has disabled the unlatching mechanism in accordance with listed fire door test procedures.
7. Doors serving roofs not intended to be occupied shall be permitted to be locked, preventing entry to the building from the roof.
8. Other than egress courts, where occupants must egress from an exterior space through the building for means of egress, exit access doors shall be permitted to be equipped with an approved locking device where installed and operated in accordance with all of the following:
   8.1. The maximum occupant load shall be posted where required by Section 1004.9. Such sign shall be permanently affixed inside the building and shall be posted in a conspicuous space near all the exit access doorways.
   8.2. A weatherproof telephone or two-way communication system installed in accordance with Sections 1009.8.1 and 1009.8.2 shall be located adjacent to not less than one required exit access door on the exterior side.
   8.3. The egress door locking device is readily distinguishable as locked and shall be a key-operated locking device.
   8.4. A clear window or glazed door opening, not less than 5 square feet (0.46 m^2) in area, shall be provided at each exit access door to determine if there are occupants using the outdoor area.
   8.5. A readily visible durable sign shall be posted on the interior side on or adjacent to each locked required exit access door serving the exterior area stating: "THIS DOOR TO REMAIN UNLOCKED WHEN THE OUTDOOR AREA IS OCCUPIED." The letters on the sign shall be not less than 1 inch (25.4 mm) high on a contrasting background.
   8.6. The occupant load of the occupied exterior area shall not exceed 300 occupants in accordance with Section 1004.
9. Locking devices are permitted on doors to balconies, decks or other exterior spaces serving individual dwelling or sleeping units.
10. Locking devices are permitted on doors to balconies, decks or other exterior spaces of 250 square feet (23.23 m^2) or less, serving a private office space.

[BE] TABLE 1010.2.4—MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS

APPLICATION WITH A PAIR OF DOORS WITH AN ACTIVE LEAF AND AN INACTIVE LEAF	THE PAIR OF DOORS ARE REQUIRED TO COMPLY WITH *CBC* SECTION 716	PERMITTED USES OF MANUAL BOLTS, AUTOMATIC FLUSH BOLTS AND CONSTANT LATCHING BOLTS ON THE INACTIVE LEAF OF A PAIR OF DOORS		
		Surface- or flush-mounted manual bolts	Automatic flush bolts	Constant latching bolts
Group B, F or S occupancies with occupant load less than 50.	No	P	P	P
	Yes	NP	NP[b]	P
Group B, F or S occupancies where the building is equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 and the inactive leaf is not needed to meet egress capacity requirements.	No	P	P	P
	Yes	NP	NP[b]	P
Group I-2 patient care and sleeping rooms where inactive leaf is not needed to meet egress capacity requirements.	No	NP	NP[b]	P
	Yes	NP	NP[b]	P
Any occupancy where panic hardware is not required, egress doors are used in pairs, and where both leaves are required to meet egress capacity requirements.	No	NP	P	NP
	Yes	NP	NP[b]	NP
Storage or equipment rooms where the inactive leaf is not needed to meet egress capacity requirements.	No	P[a]	P	P
	Yes	P[a]	P	P

P = Permitted. NP = Not Permitted.

a. Not permitted on corridor doors in Group I-2 occupancies where corridor doors are required to be positive latching.

b. Permitted where both doors are self-closing or automatic-closing, and are provided with a coordinator that causes the inactive leaf to be closed prior to the active leaf.

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[BE] 1010.2.5 Closet doors. Closet doors that latch in the closed position shall be openable from inside the closet.

[BE] 1010.2.6 Stairway doors. Interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.

Exceptions:

1. Stairway discharge doors shall be openable from the egress side and shall only be locked from the opposite side.
2. This section shall not apply to doors arranged in accordance with Section 403.5.3 of the *California Building Code*.
3. Stairway exit doors shall not be locked from the side opposite the egress side, unless they are openable from the egress side and capable of being unlocked simultaneously without unlatching by any of the following methods:
   - 3.1. Shall be capable of being unlocked individually or simultaneously upon a signal from the fire command center, where present, or a signal by emergency personnel from a single location inside the main entrance to the building.
   - 3.2. Shall unlock simultaneously upon activation of a fire alarm signal when a fire alarm system is present in an area served by the stairway.
   - 3.3. Shall unlock upon failure of the power supply to the electric lock or the locking system.
4. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group B, F, M and S occupancies where the only interior access to the tenant space is from a single exit stairway where permitted in Section 1006.3.4.
5. Stairway exit doors shall be openable from the egress side and shall only be locked from the opposite side in Group R-2 occupancies where the only interior access to the dwelling unit is from a single exit stairway where permitted in Section 1006.3.4.

[BE] 1010.2.7 Locking arrangements in educational occupancies. In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors from classrooms, offices and other occupied rooms with locking arrangements designed to keep intruders from entering the room shall comply with all of the following conditions:

1. The door shall be capable of being unlocked from outside the room with a key or other approved means.
2. The door shall be openable from within the room in accordance with Section 1010.2.
3. Modifications shall not be made to listed panic hardware, fire door hardware or door closers.
4. Modifications to fire door assemblies shall be in accordance with NFPA 80.

Remote locking or unlocking of doors from an approved location shall be permitted in addition to the unlocking operation in Item 1.

1010.2.7.1 Special provisions school classrooms. *School classrooms constructed after January 1, 1990, not equipped with automatic sprinkler systems, which have metal grilles or bars on all their windows and do not have at least two exit doors within 3 feet (914 mm) of each end of the classroom opening to the exterior of the building or to a common hallway used for evacuation purposes, shall have an inside release for the grilles or bars on at least one window farthest from the exit doors. The window or windows with the inside release shall be clearly marked as emergency exits.*

1010.2.7.2 Group E lockable doors from the inside. *New buildings that are included in public schools (kindergarten through 12th grade) state-funded projects and are receiving state funding pursuant to Leroy F. Green, School Facilities Act of 1998, California Education Code Sections 17070.10 through 17079, and that are submitted to the Division of the State Architect for plan review after July 1, 2011, in accordance with Education Code 17075.50 shall include locks that allow doors to classrooms and any room with an occupancy of five or more persons to be locked from the inside. The locks shall conform to the specification and requirements found in Section 1010.2.*

Exceptions:

1. *Doors that are locked from the outside at all times such as, but not limited to, janitor's closet, electrical room, storage room, boiler room, elevator equipment room and pupil restroom.*
2. *Reconstruction projects that utilize original plans in accordance with California Administrative Code, Section 4-314.*
3. *Existing relocatable buildings that are relocated within the same site, in accordance with California Administrative Code, Section 4-314.*

[BE] 1010.2.8 Panic and fire exit hardware. Swinging doors serving a Group H occupancy and swinging doors serving rooms or spaces with an occupant load of 50 or more in a Group A or E occupancy, *assembly area not classified as an assembly occupancy, E, or I-2 occupancies* shall not be provided with a latch or lock other than panic hardware or fire exit hardware. *For Group L occupancies see Section 453.6.3 of the California Building Code.*

Exceptions:

1. A main exit of a Group A occupancy shall be permitted to have locking devices in accordance with Section 1010.2.4, Item 3.
2. Doors provided with panic hardware or fire exit hardware and serving a Group A or E occupancy shall be permitted to be electrically locked in accordance with Section 1010.2.10.
3. Exit access doors serving occupied exterior areas shall be permitted to be locked in accordance with Section 1010.2.4, Item 8.
4. Courtrooms shall be permitted to be locked in accordance with Section 1010.2.12, Item 3.

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[BE] 1010.2.8.1 Refrigeration machinery room. Refrigeration machinery rooms larger than 1,000 square feet (93 m^2) shall have not less than two exit or exit access doorways that swing in the direction of egress travel and shall be equipped with panic hardware or fire exit hardware.

[BE] 1010.2.8.2 Rooms with electrical equipment. Exit or exit access doors serving transformer vaults, rooms designated for batteries or energy storage systems, or modular data centers shall be equipped with panic hardware or fire exit hardware. Rooms containing electrical equipment rated 800 amperes or more that contain overcurrent devices, switching devices or control devices and where the exit or exit access door is less than 25 feet (7620 mm) from the equipment working space as required by *the California Electrical Code,* such doors shall not be provided with a latch or lock other than panic hardware or fire exit hardware. The doors shall swing in the direction of egress travel.

[BE] 1010.2.8.3 Installation. Where panic or fire exit hardware is installed, it shall comply with the following:

1. Panic hardware shall be listed in accordance with UL 305.
2. Fire exit hardware shall be listed in accordance with UL 10C and UL 305.
3. The actuating portion of the releasing device shall extend not less than one-half of the door leaf width.
4. The maximum unlatching force shall not exceed 15 pounds (67 N).

[BE] 1010.2.8.4 Balanced doors. If balanced doors are used and panic hardware is required, the panic hardware shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side.

[BE] 1010.2.9 Monitored or recorded egress, and access control systems. Where electrical systems that monitor or record egress activity are incorporated, or where the door has an access control system, the locking system shall on the egress side of the door comply with Section 1010.2.10, 1010.2.11, 1010.2.12, 1010.2.13, 1010.2.14 or 1010.2.15 or shall be readily openable from the egress side without the use of a key or special knowledge or effort.

[BE] 1010.2.10 Door hardware release of electrically locked egress doors. Door hardware release of electrical locking systems shall be permitted on doors in the means of egress in any occupancy except Group H where installed and operated in accordance with all of the following:

1. The door hardware that is affixed to the door leaf has an obvious method of operation that is readily operated under all lighting conditions.
2. The door hardware is capable of being operated with one hand and shall comply with Section 1010.2.1.
3. Operation of the door hardware directly interrupts the power to the electric lock and unlocks the door immediately.
4. Loss of power to the electrical locking system automatically unlocks the electric lock.
5. Where panic or fire exit hardware is required by Section 1010.2.8, operation of the panic or fire exit hardware also releases the electric lock.
6. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL1034.

[BE] 1010.2.11 Sensor release of electrically locked egress doors. Sensor release of electrical locking systems shall be permitted on doors located in the means of egress in any occupancy except Group *E,* H *or L* where installed and operated in accordance with all of the following criteria:

1. The sensor shall be installed on the egress side, arranged to detect an occupant approaching the doors and shall cause the electrical locking system to unlock the electric lock.
2. Upon a signal from a sensor or loss of power to the sensor, the electrical locking system shall unlock the electric lock.
3. Loss of power to the electric lock or electrical locking system shall automatically unlock the electric locks.
4. The doors shall be arranged to unlock the electric lock from a manual unlocking device located 40 inches to 48 inches (1016 mm to 1219 mm) vertically above the floor and within 5 feet (1524 mm) of the secured doors. Ready access shall be provided to the manual unlocking device and the device shall be clearly identified by a sign that reads "PUSH TO EXIT." When operated, the manual unlocking device shall result in direct interruption of power to the electric lock—independent of other electronics—and the electric lock shall remain unlocked for not less than 30 seconds.
5. Activation of the building fire alarm system, where provided, shall automatically unlock the electric lock, and the electric lock shall remain unlocked until the fire alarm system has been reset.
6. Activation of the building automatic sprinkler system or fire detection system, where provided, shall automatically unlock the electric lock. The electric lock shall remain unlocked until the fire alarm system has been reset.
7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

1010.2.11.1 Access-controlled elevator lobby doors in high-rise office buildings. *For elevator lobbies in high-rise office buildings where the occupants of the floor are not required to travel through the elevator lobby to reach an exit, when approved by the fire chief, the doors separating the elevator lobby from the adjacent occupied tenant space that also serve as the entrance doors to the tenant space shall be permitted to be equipped with an approved entrance and egress access control provided all of the following requirements are met:*

1. *The building is provided throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.*
2. *A smoke detector is installed on the ceiling on the tenant side of the elevator lobby doors along the center line of the door opening, not less than 1 foot and not more than 5 feet from the door opening, and is connected to the fire alarm system.*

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3. *A remote master switch capable of unlocking the elevator lobby doors shall be provided in the fire command center for use by the fire department.*
4. *Locks for the elevator lobby shall be UL and California State Fire Marshal listed fail-safe type locking mechanisms. The locking device shall automatically release on activation of any fire alarm device on the floor of alarm (waterflow, smoke detector, manual pull stations, etc.). All locking devices shall unlock, but not unlatch, upon activation.*
5. *A two-way voice communication system, utilizing dedicated lines, shall be provided from each locked elevator lobby to the 24-hour staffed location on site, annunciated as to location. Operating instructions shall be posted above each two-way communication device.*

   Exception: *When approved by the fire chief, a two-way voice communication system to an off-site facility may be permitted where means to remotely unlock the access controlled doors from the off-site facility are provided.*
6. *An approved momentary mushroom-shaped palm button connected to the doors and installed adjacent to each locked elevator lobby door shall be provided to release the door locks when operated by an individual in the elevator lobby. The locks shall be reset manually at the door. Mount palm button so that the center line is 48 inches above the finished floor.*

   Provide a sign stating:

   "IN CASE OF EMERGENCY,
   PUSH PALM BUTTON,
   DOOR WILL UNLOCK AND
   SECURITY ALARM WILL SOUND."

   The sign lettering shall be $^{3}/_{4}$-inch high letters by $^{1}/_{8}$-inch width stroke on a contrasting background.
7. *Loss of power to that part of the access control system which locks the doors shall automatically unlock the doors.*

[BE] 1010.2.12 Delayed egress. Delayed egress electrical locking systems shall be permitted on doors in the means of egress serving the following occupancies in buildings that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 *and* an approved automatic smoke or heat detection system installed in accordance with Section 907:

1. Group B, F, I, M, R, S and U occupancies.
2. Group E classrooms with an occupant load of less than 50.
3. In courtrooms in Group A-3 and B occupancies, delayed egress electrical locking systems shall be permitted to be installed on exit or exit access doors, other than the main exit or exit access door, in buildings that are equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 *and an approved automatic smoke detection system installed in accordance with Section 907.*

[BE] 1010.2.12.1 Delayed egress locking system. The delayed egress electrical locking system shall be installed and operated in accordance with all of the following:

1. The delay of the delayed egress electrical locking system shall deactivate upon actuation of the *automatic sprinkler system required by Section 1010.2.13 and the delay electronics of the delayed egress locking system shall deactivate upon actuation of the smoke or heat detection system required by Section 1010.2.13,* allowing immediate, free egress.
2. The delay of the delayed egress electrical locking system shall deactivate upon loss of power to the electrical locking system or electrical lock, allowing immediate free egress, *to any one of the following:*
   2.1. The egress-control device itself.
   2.2. The smoke detection system.
   2.3. Means of egress illumination as required by Section 1008.
3. The delay of the delayed egress locking electrical system shall have the capability of being deactivated at the fire command center and other approved locations.
4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initiation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay has been deactivated, rearming the delay electronics shall be by manual means only. *The time delay established for each egress-control device shall not be field adjustable. For applications listed in Section 1.9.1 regulated by the Division of the State Architect—Access Compliance, see Chapter 11B.*

   Exception: *In facilities housing Alzheimer's or dementia clients,* a delay of not more than 30 seconds is permitted on a delayed egress door.
5. The egress path from any point shall not pass through more than one delayed egress locking system.

   Exceptions:

   1. In Group *R-2.1*, Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds.
   2. In Group I-4 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided that the combined delay does not exceed 30 seconds and the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

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6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

   Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who, because of clinical needs, require restraint or containment as part of the function of the treatment area.

   6.1. For doors that swing in the direction of egress, the sign shall read: "PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.2. For doors that swing in the opposite direction of egress, the sign shall read: "PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS."

   6.3. *Sign lettering shall be at least 1 inch (25 mm) in height and shall have a stroke of not less than $^{1}/_{8}$ inch (3.2 mm).*

   6.4. A tactile sign shall also be provided in Braille and raised characters, which complies with Chapter 11B.

7. Emergency lighting shall be provided on the egress side of the door.
8. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.
9. *Actuation of the panic bar or other door-latching hardware shall activate an audible signal at the door.*
10. *The unlatching shall not require more than one operation.*
11. *Regardless of the means of deactivation, relocking of the egress-control device shall be by manual means only at the door.*

[BE] 1010.2.13 Controlled egress doors in Group I-2. Controlled egress electrical locking systems where egress is controlled by authorized personnel shall be permitted on doors in the means of egress in Group I-2 occupancies where the clinical needs of persons receiving *psychiatric or mental health treatment* require their *restraint or* containment. Controlled egress doors shall be permitted in such occupancies where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 *and* an approved automatic smoke detection system installed in accordance with Section 907, provided that the doors are installed and operate in accordance with all of the following:

1. The door's electric locks shall unlock on actuation of the automatic sprinkler system or automatic smoke detection system allowing immediate free egress.
2. The door's electric locks shall unlock on loss of power to the electrical locking system or to the electric lock mechanism allowing immediate free egress.
3. The electrical locking system shall be installed to have the capability of unlocking the electric locks by a switch located at the fire command center, a nursing station or other approved location. The switch shall directly break power to the electric lock.
4. A building occupant shall not be required to pass through more than one door equipped with a controlled egress locking system before entering an exit.
5. All staff shall have the keys, codes or other means necessary to operate the controlled egress electrical locking systems.
6. Emergency lighting shall be provided at the door.
7. The electromechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

Exception: Items 1 through 4 shall not apply to doors to areas occupied by persons who, because of clinical needs, require restraint or containment as part of the function of a psychiatric or *mental health* treatment area.

[BE] 1010.2.14 Elevator lobby exit access doors. Electrically locked exit access doors providing egress from elevator lobbies shall the following conditions:

1. For all occupants of the floor, the path of exit access travel to not less than two exits is not required to pass through the elevator lobby.
2. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, and a fire alarm system in accordance with Section 907. Elevator lobbies shall be provided with an approved automatic smoke detection system in accordance with Section 907.
3. Upon activation of either the automatic sprinkler system or automatic smoke detection system, the building fire alarm system by means other than a manual fire alarm box shall automatically unlock the electric locks providing exit access from the elevator lobbies, and the electric locks shall remain unlocked until the fire alarm system is reset.
4. The electric locks shall unlock on loss of power to the electric locks or electrical locking system.
5. The electric locks shall have the capability of being unlocked by a switch located at the fire command center, security station or other approved location.
6. A two-way communication system complying with Sections 1009.8.1 and 1009.8.2, shall be located in the elevator lobby adjacent to the electrically locked exit access door and connected to an approved constantly attended station. This constantly attended station shall have the capability of unlocking the electric locks of the elevator lobby exit access doors.
7. Emergency lighting shall be provided in the elevator lobby on both sides of the electrically locked door.
8. The electro-mechanical or electromagnetic locking device shall be listed in accordance with either UL 294 or UL 1034.

[BE] 1010.2.15 *Reserved.*

[BE] 1010.3 Special doors. Special doors and security grilles shall comply with the requirements of Sections 1010.3.1 through 1010.3.4.

[BE] 1010.3.1 Revolving doors. Revolving doors shall comply with the following:

1. Revolving doors shall comply with BHMA A156.27 and shall be installed in accordance with the manufacturer's instructions.
2. Each revolving door shall be capable of breakout in accordance with BHMA A156.27 and shall provide an aggregate width of not less than 36 inches (914 mm).
3. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of stairways or escalators. A dispersal area shall be provided between the stairways or escalators and the revolving doors.
4. The revolutions per minute (rpm) for a revolving door shall not exceed the maximum rpm as specified in BHMA A156.27. Manual revolving doors shall comply with Table 1010.3.1(1). Automatic or power-operated revolving doors shall comply with Table 1010.3.1(2).
5. An emergency stop switch shall be provided near each entry point of power or automatic operated revolving doors within 48 inches (1219 mm) of the door and between 34 inches (864 mm) and 48 inches (1219 mm) above the floor. The activation area of the emergency stop switch button shall be not less than 1 inch (25 mm) in diameter and shall be red.
6. Each revolving door shall have a side-hinged swinging door that complies with Section 1010.1 in the same wall and within 10 feet (3048 mm) of the revolving door.
7. Revolving doors shall not be part of an accessible route required by Section 1009 of this code and Chapter 11 of the *California Building Code*.

[BE] TABLE 1010.3.1(1)—MAXIMUM DOOR SPEED MANUAL REVOLVING DOORS

REVOLVING DOOR MAXIMUM NOMINAL DIAMETER (FT-IN)	MAXIMUM ALLOWABLE REVOLVING DOOR SPEED (RPM)
6-0	12
7-0	11
8-0	10
9-0	9
10-0	8

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

[BE] TABLE 1010.3.1(2)—MAXIMUM DOOR SPEED AUTOMATIC OR POWER-OPERATED REVOLVING DOORS

REVOLVING DOOR MAXIMUM NOMINAL DIAMETER (FT-IN)	MAXIMUM ALLOWABLE REVOLVING DOOR SPEED (RPM)
8-0	7.2
9-0	6.4
10-0	5.7
11-0	5.2
12-0	4.8
12-6	4.6
14-0	4.1
16-0	3.6
17-0	3.4
18-0	3.2
20-0	2.9
24-0	2.4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

[BE] 1010.3.1.1 Egress component. A revolving door used as a component of a means of egress shall comply with Section 1010.3.1 and the following three conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the minimum width or required capacity.
2. Each revolving door shall be credited with a capacity based on not more than a 50-person occupant load.
3. Each revolving door shall provide for egress in accordance with BHMA A156.27 with a breakout force of not more than 130 pounds (578 N).

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[BE] 1010.3.1.2 Other than egress component. A revolving door used as other than a component of a means of egress shall comply with Section 1010.3.1. The breakout force of a revolving door not used as a component of a means of egress shall not be more than 180 pounds (801 N).

Exception: A breakout force in excess of 180 pounds (801 N) is permitted if the breakout force is reduced to not more than 130 pounds (578 N) when not less than one of the following conditions is satisfied:

1. There is a power failure or power is removed to the device holding the door wings in position.
2. There is an actuation of the automatic sprinkler system where such system is provided.
3. There is an actuation of a smoke detection system that is installed in accordance with Section 907 to provide coverage in areas within the building that are within 75 feet (22 860 mm) of the revolving doors.
4. There is an actuation of a manual control switch, in an approved location and clearly identified, that reduces the breakout force to not more than 130 pounds (578 N).

[BE] 1010.3.2 Power-operated doors. Where means of egress doors are operated or assisted by power, the design shall be such that in the event of power failure, the door is capable of being opened manually to permit means of egress travel or closed where necessary to safeguard means of egress. The forces required to open these doors manually shall not exceed those specified in Section 1010.1.3, except that the force to set the door in motion shall not exceed 50 pounds (220 N). The door shall be capable of opening from any position to the full width of the opening in which such door is installed when a force is applied to the door on the side from which egress is made. Power-operated swinging doors, power-operated sliding doors and power-operated folding doors shall comply with BHMA A156.10. Power-assisted swinging doors and low energy power-operated swinging doors shall comply with BHMA A156.19. Low-energy power-operated sliding doors and low-energy power-operated folding doors shall comply with BHMA A156.38.

Exceptions:

1. Occupancies in Group I-3.
2. Special-purpose horizontal sliding, accordion or folding doors complying with Section 1010.3.3.
3. For a biparting door in the emergency breakout mode, a door leaf located within a multiple-leaf opening shall be exempt from the minimum 32-inch (813 mm) single-leaf requirement of Section 1010.1.1, provided that a minimum 32-inch (813 mm) clear opening is provided when the two biparting leaves meeting in the center are broken out.

[BE] 1010.3.3 Special-purpose horizontal sliding, accordion or folding doors. In other than Group H occupancies, special-purpose horizontal sliding, accordion, or folding door assemblies permitted to be a component of a means of egress in accordance with Exception 6 to Section 1010.1.2 shall comply with all of the following criteria:

1. The doors shall be power operated and shall be capable of being operated manually in the event of power failure.
2. The doors shall be openable by a simple method without special knowledge or effort from the egress side or sides.
3. The force required to operate the door shall not exceed 30 pounds (133 N) to set the door in motion and 15 pounds (67 N) to close the door or open it to the minimum required width.
4. The door shall be openable with a force not to exceed 15 pounds (67 N) when a force of 250 pounds (1100 N) is applied perpendicular to the door adjacent to the operating device.
5. The door assembly shall comply with the applicable fire protection rating and, where rated, shall be self-closing or automatic closing by smoke detection in accordance with Section 716.2.6.6 of the *California Building Code*, shall be installed in accordance with NFPA 80 and shall comply with Section 716 of the *California Building Code*.
6. The door assembly shall have an integrated standby power supply.
7. The door assembly power supply shall be electrically supervised.
8. The door shall open to the minimum required width within 10 seconds after activation of the operating device.

[BE] 1010.3.4 Security grilles. In Groups B, F, M and S, horizontal sliding or vertical security grilles are permitted at the main exit and shall be openable from the inside without the use of a key or special knowledge or effort during periods that the space is occupied. The grilles shall remain secured in the full-open position during the period of occupancy by the general public. Where two or more exits or access to exits are required, not more than one-half of the exits or exit access doorways shall be equipped with horizontal sliding or vertical security grilles.

[BE] 1010.4 Gates. Gates serving the means of egress system shall comply with the requirements of this section. Gates used as a component in a means of egress shall conform to the applicable requirements for doors.

[BE] 1010.4.1 Stadiums. Panic hardware is not required on gates surrounding stadiums where such gates are under constant immediate supervision while the public is present, and where safe dispersal areas based on 3 square feet (0.28 m^2) per occupant are located between the fence and enclosed space. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from the enclosed space. See Section 1028.5 for means of egress from safe dispersal areas.

[BE] 1010.5 Turnstiles and similar devices. Turnstiles or similar devices that restrict travel to one direction shall not be placed so as to obstruct any required means of egress, except where permitted in accordance with Sections 1010.5.1, 1010.5.2 and 1010.5.3.

[BE] 1010.5.1 Capacity. Each turnstile or similar device shall be credited with a capacity based on not more than a 50-person occupant load where all of the following provisions are met:

1. Each device shall turn free in the direction of egress travel when primary power is lost and on the manual release by an employee in the area.

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2. Such devices are not given credit for more than 50 percent of the required egress capacity or width.
3. Each device is not more than 39 inches (991 mm) high.
4. Each device has not less than $16^{1}/_{2}$ inches (419 mm) clear width at and below a height of 39 inches (991 mm) and not less than 22 inches (559 mm) clear width at heights above 39 inches (991 mm).

[BE] 1010.5.1.1 Clear width. Where located as part of an accessible route, turnstiles shall have not less than 36 inches (914 mm) clear width at and below a height of 34 inches (864 mm), not less than 32 inches (813 mm) clear width between 34 inches (864 mm) and 80 inches (2032 mm) and shall consist of a mechanism other than a revolving device.

[BE] 1010.5.2 Security access turnstiles. Security access turnstiles that inhibit travel in the direction of egress utilizing a physical barrier shall be permitted to be considered as a component of the means of egress, provided that all of the following criteria are met:

1. The building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 903.3.1.1.
2. Each security access turnstile lane configuration has a minimum clear passage width of 22 inches (559 mm).
3. Any security access turnstile lane configuration providing a clear passage width of less than 32 inches (810 mm) shall be credited with a maximum egress capacity of 50 persons.
4. Any security access turnstile lane configuration providing a clear passage width of 32 inches (810 mm) or more shall be credited with a maximum egress capacity as calculated in accordance with Section 1005.
5. Each secured physical barrier shall automatically retract or swing to an unobstructed open position in the direction of egress, under each of the following conditions:
    5.1. Upon loss of power to the turnstile or any part of the access control system that secures the physical barrier.
    5.2. Upon actuation of a clearly identified manual release device with ready access that results in direct interruption of power to each secured physical barrier, after which such barriers remain in the open position for not less than 30 seconds. The manual release device shall be positioned at one of the following locations:
        5.2.1. On the egress side of each security access turnstile lane.
        5.2.2. At an approved location where it can be actuated by an employee assigned to the area at all times that the building is occupied.
    5.3. Upon actuation of the building fire alarm system, if provided, after which the physical barrier remains in the open position until the fire alarm system is manually reset.

    Exception: Actuation of a manual fire alarm box.
    5.4. Upon actuation of the building automatic sprinkler system or fire detection system, after which the physical barrier remains in the open position until the fire alarm system is manually reset.

[BE] 1010.5.3 High turnstile. Turnstiles more than 39 inches (991 mm) high shall meet the requirements for revolving doors or the requirements of Section 1010.5.2 for security access turnstiles.

[BE] 1010.5.4 Additional door. Where serving an occupant load greater than 300, each turnstile that is not portable shall have a side-hinged swinging door that conforms to Section 1010.1 within 50 feet (15 240 mm).

Exception: A side-hinged swinging door is not required at security access turnstiles that comply with Section 1010.5.2.

SECTION 1011—STAIRWAYS

[BE] 1011.1 General. Stairways serving occupied portions of a building shall comply with the requirements of Sections 1011.2 through 1011.13. Alternating tread devices shall comply with Section 1011.14. Ship's ladders shall comply with Section 1011.15. Ladders shall comply with Section 1011.16.

Exception: Within rooms or spaces used for assembly purposes, stepped aisles shall comply with Section 1030.

[BE] 1011.2 Width and capacity. The required capacity of stairways shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm). The minimum width for stairways that serve as part of the accessible means of egress shall comply with Section 1009.3.

Exceptions:

1. Stairways serving an occupant load of less than 50 shall have a width of not less than 36 inches (914 mm).
2. Spiral stairways as provided for in Section 1011.10.
3. Where an incline platform lift or stairway chairlift is installed on stairways serving occupancies in Group R-3, or within dwelling units in occupancies in Group R-2, a clear passage width not less than 20 inches (508 mm) shall be provided. Where the seat and platform can be folded when not in use, the distance shall be measured from the folded position.

Means of egress stairs in a Group I-2 or ambulatory care facility occupancy used for the movement of beds and stretcher patients shall provide a clear width not less than 44 inches (1118 mm).

[BE] 1011.3 Headroom. Stairways shall have a headroom clearance of not less than 80 inches (2032 mm) measured vertically from a line connecting the nosings. Such headroom shall be continuous above the stairway to the point where the line intersects the landing below, one tread depth beyond the bottom riser. The minimum clearance shall be maintained the full width of the stairway and landing.

Exceptions:

1. Spiral stairways complying with Section 1011.10 are permitted a 78-inch (1981 mm) headroom clearance.

2. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; where the nosings of treads at the side of a flight extend under the edge of a floor opening through which the stair passes, the floor opening shall be allowed to project horizontally into the required headroom not more than $4^3/_4$ inches (121 mm).

[BE] 1011.4 Walkline. The walkline across winder treads shall be concentric to the direction of travel through the turn and located 12 inches (305 mm) from the side where the winders are narrower. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear stair width at the walking surface of the winder. Where winders are adjacent within the flight, the point of the widest clear stair width of the adjacent winders shall be used.

[BE] 1011.5 Stair treads and risers. Stair treads and risers shall comply with Sections 1011.5.1 through 1011.5.5.3.

[BE] 1011.5.1 Dimension reference surfaces. For the purpose of this section, all dimensions are exclusive of carpets, rugs or runners.

[BE] 1011.5.2 Riser height and tread depth. Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the nosings of adjacent treads or between the stairway landing and the adjacent tread. Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's nosing. Winder treads shall have a minimum tread depth of 11 inches (279 mm) between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline and a minimum tread depth of 10 inches (254 mm) within the clear width of the stair.

Exceptions:

1. Spiral stairways in accordance with Section 1011.10.
2. Stairways connecting stepped aisles to cross aisles or concourses shall be permitted to use the riser/tread dimension in Section 1030.14.2.
3. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies not required by Chapter 11 to be Accessible or Type A dwelling or sleeping units; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; the maximum riser height shall be $7^3/_4$ inches (197 mm); the minimum tread depth shall be 10 inches (254 mm); the minimum winder tread depth at the walkline shall be 10 inches (254 mm); and the minimum winder tread depth shall be 6 inches (152 mm). A nosing projection not less than $^3/_4$ inch (19.1 mm) but not more than $1^1/_4$ inches (32 mm) shall be provided on stairways with solid risers where the tread depth is less than 11 inches (279 mm).
4. See *Chapter 11 and California Existing Building Code* Section 503.1 for the replacement of existing stairways. ***[DSA-AC]*** *For applications listed in Section 1.9.1 of the California Building Code regulated by the Division of the State Architect-Access Compliance, see Chapter 11B, Section 11B-202.*
5. In Group I-3 facilities, stairways providing access to guard towers, observation stations and control rooms, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).
6. ***[SFM]*** *Stairways providing access to lifeguard towers not open to the public, not more than 250 square feet (23 m^2) in area, shall be permitted to have a maximum riser height of 8 inches (203 mm) and a minimum tread depth of 9 inches (229 mm).*

[BE] 1011.5.3 Winder treads. Winder treads are not permitted in means of egress stairways except within a dwelling unit.

Exceptions:

1. Curved stairways in accordance with Section 1011.9.
2. Spiral stairways in accordance with Section 1011.10.

[BE] 1011.5.4 Dimensional uniformity. Stair treads and risers shall be of uniform size and shape. The tolerance between the largest and smallest riser height or between the largest and smallest tread depth shall not exceed $^3/_8$ inch (9.5 mm) in any flight of stairs. The greatest winder tread depth at the walkline within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

Exceptions:

1. Stairways connecting stepped aisles to cross aisles or concourses shall be permitted to comply with the dimensional nonuniformity in Section 1030.14.2.
2. Consistently shaped winders, complying with Section 1011.5, differing from rectangular treads in the same flight of stairs.
3. Nonuniform riser dimension complying with Section 1011.5.4.1.

[BE] 1011.5.4.1 Nonuniform height risers. Where the bottom or top riser adjoins a sloping public way, walkway or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches (102 mm) in height, with the variation in height of the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8-percent slope) of stair width. The nosings at such nonuniform height risers shall have a distinctive marking stripe, different from any other nosing marking provided on the stair flight. The distinctive marking stripe shall be visible in descent of the stair. Marking stripes shall have a width of not less than 1 inch (25 mm) but not more than 2 inches (51 mm).

[BE] 1011.5.5 Nosing and riser profile. Nosings shall have a curvature or bevel of not less than $^{1}/_{16}$ inch (1.6 mm) but not more than $^{9}/_{16}$ inch (14.3 mm) from the foremost projection of the tread. Risers shall be solid and vertical or sloped under the tread above from the underside of the nosing above at an angle not more than 30 degrees (0.52 rad) from the vertical.

[BE] 1011.5.5.1 Nosing projection size. The nosings shall project not more than $1^{1}/_{4}$ inches (32 mm) beyond the tread below.

Exception: When solid risers are not required, the nosing projection is permitted to exceed the maximum projection.

[BE] 1011.5.5.2 Nosing projection uniformity. Nosing projections shall be of uniform size, including the projections of the nosings of the floor or landing at the top of a flight.

[BE] 1011.5.5.3 Solid risers. Risers shall be solid.

Exceptions:

1. Solid risers are not required for stairways that are not required to comply with Section 1009.3, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. Solid risers are not required for occupancies in Group I-3 or in Group F, H and S occupancies other than areas accessible to the public. The size of the opening in the riser is not restricted.
3. Solid risers are not required for spiral stairways constructed in accordance with Section 1011.10.

[BE] 1011.6 Stairway landings. There shall be a floor or landing at the top and bottom of each stairway. The width of landings, measured perpendicularly to the direction of travel, shall be not less than the width of stairways served. Every landing shall have a minimum depth, measured parallel to the direction of travel, equal to the width of the stairway or 48 inches (1219 mm), whichever is less. Doors opening onto a landing shall not reduce the landing to less than one-half the required width. When fully open, the door shall not project more than 7 inches (178 mm) into the required width of a landing. Where wheelchair spaces are required on the stairway landing in accordance with Section 1009.6.3, the wheelchair space shall not be located in the required width of the landing and doors shall not swing over the wheelchair spaces.

Exceptions:

1. Where stairways connect stepped aisles to cross aisles or concourses, stairway landings are not required at the transition between stairways and stepped aisles constructed in accordance with Section 1030.
2. Where curved stairways of constant radius have intermediate landings, the landing depth shall be measured horizontally between the intersection of the walkline of the lower flight at the landing nosing and the intersection of the walkline of the upper flight at the nosing of the lowest tread of the upper flight.
3. Where a landing turns 90 degrees (1.57 rad) or more, the minimum landing depth in accordance with this section shall not be required where the landing provided is not less than that described by an arc with a radius equal to the width of the flight served.
4. *In Group R-3 occupancies, a floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs.*

[BE] 1011.7 Stairway construction. Stairways shall be built of materials consistent with the types permitted for the type of construction of the building.

Exceptions:

1. Wood handrails shall be permitted in all types of construction.
2. Interior exit stairway in accordance with Section 510.2 of the *California Building Code*.

[BE] 1011.7.1 Stairway walking surface. The walking surface of treads and landings of a stairway shall not be sloped steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. Stairway treads and landings shall have a solid surface. Finish floor surfaces shall be securely attached.

Exceptions:

1. Openings in stair walking surfaces shall be a size that does not permit the passage of $^{1}/_{2}$-inch-diameter (12.7 mm) sphere. Elongated openings shall be placed so that the long dimension is perpendicular to the direction of travel.
2. In Group F, H and S occupancies, other than areas of parking structures accessible to the public, openings in treads and landings shall not be prohibited provided that a sphere with a diameter of $1^{1}/_{8}$ inches (29 mm) cannot pass through the opening.

[BE] 1011.7.2 Outdoor conditions. Outdoor stairways and outdoor approaches to stairways shall be designed so that water will not accumulate on walking surfaces.

[BE] 1011.7.3 Enclosures under interior stairways. The walls and soffits within enclosed usable spaces under enclosed and unenclosed stairways shall be protected by 1-hour fire-resistance-rated construction or the fire-resistance rating of the stairway enclosure, whichever is greater. Access to the enclosed space shall not be directly from within the stairway enclosure.

Exception: Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 or R-3 shall be permitted to be protected on the enclosed side with $^{1}/_{2}$-inch (12.7 mm) gypsum board.

[BE] 1011.7.4 Enclosures under exterior stairways. There shall not be enclosed usable space under exterior exit stairways unless the space is completely enclosed in 1-hour fire-resistance-rated construction. The open space under exterior stairways shall not be used for any purpose.

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[BE] 1011.8 Vertical rise. A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

Exception: Spiral stairways used as a means of egress from technical production areas.

[BE] 1011.9 Curved stairways. Curved stairways with winder treads shall have treads and risers in accordance with Section 1011.5 and the smallest radius shall be not less than twice the minimum width or required capacity of the stairway.

Exception: The radius restriction shall not apply to curved stairways in Group R-3 and within individual dwelling units in Group R-2.

[BE] 1011.10 Spiral stairways. Spiral stairways are permitted to be used as a component in the means of egress only within dwelling units or from a space not more than 250 square feet (23 m^2) in area and serving not more than five occupants, or from technical production areas in accordance with Section 410.5 of the *California Building Code*.

A spiral stairway shall have a $6^3/_4$-inch (171 mm) minimum clear tread depth at a point 12 inches (305 mm) from the narrow edge. The risers shall be sufficient to provide a headroom of 78 inches (1981 mm) minimum, but riser height shall not be more than $9^1/_2$ inches (241 mm). The minimum stairway clear width at and below the handrail shall be 26 inches (660 mm).

[BE] 1011.11 Handrails. Flights of stairways shall have handrails on each side and shall comply with Section 1014. Where glass is used to provide the handrail, the handrail shall comply with Section 2407 of the *California Building Code*.

[DSA-AC] *For applications listed in Section 1.9.1 regulated by the Division of the State Architect-Access Compliance, see Chapter 11B, of the California Building Code.*

Exceptions:

1. Flights of stairways within dwelling units, and flights of spiral stairways are permitted to have a handrail on one side only.
2. Decks, patios and walkways that have a single change in elevation where the landing depth on each side of the change of elevation is greater than what is required for a landing do not require handrails.
3. ***[SFM]*** In Group R-3 occupancies, *a continuous run of treads or flight of stairs with less than four risers does not require handrails.*
4. Changes in room elevations of three or fewer risers within dwelling units and sleeping units in Group R-2 and R-3 do not require handrails.
5. Where a platform lift is in a stationary position and the floor of the platform lift serves as the upper landing of a stairway, handrails shall not be required on the stairway, provided that all of the following criteria are met:
    5.1. The stairway contains not more than two risers.
    5.2. A handhold, positioned horizontally or vertically, is located on one side of the stairway adjacent to the top landing.
    5.3. The handhold is located not less than 34 inches (864 mm) and not more than 42 inches (1067 mm) above the bottom landing of the stairway.
    5.4. The handhold gripping surface complies with Section 1014.4 and is not less than 4.5 inches (114 mm) in length.

[BE] 1011.12 Stairway to roof. In buildings four or more stories above grade plane, one stairway shall extend to the roof surface, unless the roof has a slope steeper than 4 units vertical in 12 units horizontal (33-percent slope).

Exception: Other than where required by Section 1011.12.1, in buildings without an occupiable roof, access to the roof from the top story shall be permitted to be by an alternating tread device, a ship's ladder or a permanent ladder.

[BE] 1011.12.1 Stairway to elevator equipment. Roofs and penthouses containing elevator equipment that must be accessed for maintenance are required to be accessed by a stairway.

[BE] 1011.12.2 Roof access. Where a stairway is provided to a roof, access to the roof shall be provided through a penthouse complying with Section 1511.2 of the *California Building Code*.

Exception: In buildings without an occupiable roof, access to the roof shall be permitted to be a roof hatch or trap door not less than 16 square feet (1.5 m^2) in area and having a minimum dimension of 2 feet (610 mm).

[BE] 1011.13 Guards. Guards shall be provided along stairways and landings where required by Section 1015 and shall be constructed in accordance with Section 1015. Where the roof hatch opening providing the required access is located within 10 feet (3049 mm) of the roof edge, such roof access or roof edge shall be protected by guards installed in accordance with Section 1015.

[BE] 1011.14 Alternating tread devices. Alternating tread devices are limited to an element of a means of egress in buildings of Groups F, H and S from a mezzanine not more than 250 square feet (23 m^2) in area and that serves not more than five occupants; in buildings of Group I-3 from a guard tower, observation station or control room not more than 250 square feet (23 m^2) in area and for access to unoccupiable roofs. Alternating tread devices used as a means of egress shall not have a rise greater than 20 feet (6096 mm) between floor levels or landings.

[BE] 1011.14.1 Handrails of alternating tread devices. Handrails shall be provided on both sides of alternating tread devices and shall comply with Section 1014.

[BE] 1011.14.2 Treads of alternating tread devices. Alternating tread devices shall have a minimum tread depth of 5 inches (127 mm), a minimum projected tread depth of $8^1/_2$ inches (216 mm), a minimum tread width of 7 inches (178 mm) and a maximum riser height of $9^1/_2$ inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The

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riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing or floor surface.

Exception: Alternating tread devices used as an element of a means of egress in buildings from a mezzanine area not more than 250 square feet (23 m^2) in area that serves not more than five occupants shall have a minimum tread depth of 3 inches (76 mm) with a minimum projected tread depth of $10^1/_2$ inches (267 mm). The rise to the next alternating tread surface shall not exceed 8 inches (203 mm).

[BE] 1011.15 Ship's ladders. Ship's ladders are permitted to be used in *lifeguard towers not open to the public and* Group I-3 as a component of a means of egress to and from control rooms or elevated facility observation stations not more than 250 square feet (23 m^2) with not more than three occupants and for access to unoccupiable roofs. The minimum clear width at and below the handrails shall be 20 inches (508 mm). Ship's ladders shall be designed for the live loads indicated in Section 1607.10 of the *California Building Code*.

[BE] 1011.15.1 Handrails of ship's ladders. Handrails shall be provided on both sides of ship's ladders.

[BE] 1011.15.2 Treads of ship's ladders. Ship's ladders shall have a minimum tread depth of 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than $8^1/_2$ inches (216 mm). The maximum riser height shall be $9^1/_2$ inches (241 mm).

[BE] 1011.16 Ladders. Permanent ladders shall not serve as a part of the *means of egress* from occupied spaces within a building. Permanent ladders shall be constructed in accordance with Section *304.3* of the *California Mechanical Code* and designed for the live loads indicated in Section 1607.10 of the *California Building Code*. Permanent ladders shall be permitted to provide access to the following areas:

1. Spaces frequented only by personnel for maintenance, repair or monitoring of equipment.
2. Nonoccupiable spaces accessed only by catwalks, crawl spaces, freight elevators or very narrow passageways.
3. Raised areas used primarily for purposes of security, life safety or fire safety including, but not limited to, observation galleries, prison guard towers, fire towers or lifeguard stands.
4. Elevated levels in Group U not open to the general public.
5. Nonoccupiable roofs that are not required to have stairway access in accordance with Section 1011.12.1.
6. Where permitted to access equipment and appliances in accordance with Section *304.3* of the *California Mechanical Code*.

SECTION 1012—RAMPS

[BE] 1012.1 Scope. The provisions of this section shall apply to ramps used as a component of a means of egress.

Exceptions:

1. Ramped aisles within assembly rooms or spaces shall comply with the provisions in Section 1030.
2. Curb ramps shall comply with ICC A117.1.
3. Vehicle ramps in parking garages for pedestrian exit access shall not be required to comply with Sections 1012.3 through 1012.10 where they are not an accessible route serving accessible parking spaces, other required accessible elements or part of an accessible means of egress.

[BE] 1012.2 Slope. Ramps used as part of a means of egress shall have a running slope not steeper than 1 unit vertical in 12 units horizontal (8-percent slope). The slope of other pedestrian ramps shall not be steeper than 1 unit vertical in 8 units horizontal (12.5-percent slope).

[BE] 1012.3 Cross slope. The slope measured perpendicular to the direction of travel of a ramp shall not be steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

[BE] 1012.4 Vertical rise. The rise for any ramp run shall be 30 inches (762 mm) maximum.

[BE] 1012.5 Minimum dimensions. The minimum dimensions of means of egress ramps shall comply with Sections 1012.5.1 through 1012.5.3.

[BE] 1012.5.1 Width and capacity. The minimum width and required capacity of a means of egress ramp shall be not less than that required for corridors by Section 1020.3. The clear width of a ramp between handrails, if provided, or other permissible projections shall be 36 inches (914 mm) minimum.

[BE] 1012.5.2 Headroom. The minimum headroom in all parts of the means of egress ramp shall be not less than 80 inches (2032 mm) above the finished floor of the ramp run and any intermediate landings. The minimum clearance shall be maintained for the full width of the ramp and landing.

[BE] 1012.5.3 Restrictions. Means of egress ramps shall not reduce in width in the direction of egress travel. Projections into the required ramp and landing width are prohibited. Doors opening onto a landing shall not reduce the clear width to less than 42 inches (1067 mm).

[BE] 1012.6 Landings. Ramps shall have landings at the bottom and top of each ramp, points of turning, entrance, exits and at doors. Landings shall comply with Sections 1012.6.1 through 1012.6.5.

[BE] 1012.6.1 Slope. Landings shall have a slope not steeper than 1 unit vertical in 48 units horizontal (2-percent slope) in any direction. Changes in level are not permitted.

[BE] 1012.6.2 Width. The landing width shall be not less than the width of the widest ramp run adjoining the landing.

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[BE] 1012.6.3 Length. The landing length shall be 60 inches (1525 mm) minimum.

Exceptions:

1. In Group R-2 and R-3 individual dwelling and sleeping units that are not required to be Accessible units, Type A units or Type B units *in accordance with Chapter 11A or 11B of the California Building Code,* landings are permitted to be 36 inches (914 mm) minimum.
2. Where the ramp is not a part of an accessible route, the length of the landing shall not be required to be more than 48 inches (1219 mm) in the direction of travel.

[BE] 1012.6.4 Change in direction. Where changes in direction of travel occur at landings provided between ramp runs, the landing shall be 60 inches by 60 inches (1524 mm by 1524 mm) minimum.

Exception: In Group R-2 and R-3 individual dwelling or sleeping units that are not required to be Accessible units, Type A units or Type B units in accordance with Section 1108 of the *California Building Code*, landings are permitted to be 36 inches by 36 inches (914 mm by 914 mm) minimum.

[BE] 1012.6.5 Doorways. Where doorways are located adjacent to a ramp landing, maneuvering clearances required by ICC A117.1 are permitted to overlap the required landing area.

[BE] 1012.7 Ramp construction. Ramps shall be built of materials consistent with the types permitted for the type of construction of the building, except that wood handrails shall be permitted for all types of construction.

[BE] 1012.7.1 Ramp surface. The surface of ramps shall be of slip-resistant materials that are securely attached.

[BE] 1012.7.2 Outdoor conditions. Outdoor ramps and outdoor approaches to ramps shall be designed so that water will not accumulate on walking surfaces.

[BE] 1012.8 Handrails. Ramps with a rise greater than 6 inches (152 mm) shall have handrails on both sides. Handrails shall comply with Section 1014.

[BE] 1012.9 Guards. Guards shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015.

[BE] 1012.10 Edge protection. Edge protection complying with Section 1012.10.1 or 1012.10.2 shall be provided on each side of ramp runs and at each side of ramp landings.

Exceptions:

1. Edge protection is not required on ramps that are not required to have handrails, provided that they have flared sides that comply with the ICC A117.1 curb ramp provisions.
2. Edge protection is not required on the sides of ramp landings serving an adjoining ramp run or stairway.
3. Edge protection is not required on the sides of ramp landings having a vertical dropoff of not more than $^1/_2$ inch (12.7 mm) within 10 inches (254 mm) horizontally of the required landing area.

[BE] 1012.10.1 Curb, rail, wall or barrier. A curb, rail, wall or barrier shall be provided to serve as edge protection. A curb shall be not less than 4 inches (102 mm) in height. Barriers shall be constructed so that the barrier prevents the passage of a 4-inch-diameter (102 mm) sphere, where any portion of the sphere is within 4 inches (102 mm) of the floor or ground surface.

[BE] 1012.10.2 Extended floor or ground surface. The floor or ground surface of the ramp run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with Section 1014.

SECTION 1013—EXIT SIGNS

[BE] 1013.1 Where required. Exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. The path of egress travel to exits and within exits shall be marked by readily visible exit signs to clearly indicate the direction of egress travel in cases where the exit or the path of egress travel is not immediately visible to the occupants. Intervening means of egress doors within exits shall be marked by exit signs. Exit sign placement shall be such that any point in an exit access corridor or exit passageway is within 100 feet (30 480 mm) or the listed viewing distance of the sign, whichever is less, from the nearest visible exit sign.

Exceptions:

1. Exit signs are not required in rooms or areas that require only one exit or exit access.
2. Main exterior exit doors or gates that are obviously and clearly identifiable as exits need not have exit signs where approved by the fire code official.
3. Exit signs are not required in occupancies in Group U and individual sleeping units or dwelling units in Group R-1, R-2 or R-3 *or R-3.1*.
4. Exit signs are not required *where inmates are housed or held* in dayrooms, sleeping rooms or dormitories in occupancies in Group I-3.
5. In occupancies in Groups A-4 and A-5, exit signs are not required on the seating side of vomitories or openings into seating areas where exit signs are provided in the concourse that are readily apparent from the vomitories. Egress lighting is provided to identify each vomitory or opening within the seating area in an emergency.

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[BE] 1013.2 Low-level exit signs in Group R-1. *See Section 1013.7.*

The bottom of the sign shall be not less than 10 inches (254 mm) nor more than 18 inches (455 mm) above the floor level. The sign shall be flush mounted to the door or wall. Where mounted on the wall, the edge of the sign shall be within 4 inches (102 mm) of the door frame on the latch side.

Exception: Low-level exit signs are not required in Group R-1 occupancies when the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

[BE] 1013.3 Illumination. Exit signs shall be internally or externally illuminated.

Exception: Tactile signs required by Section 1013.4 need not be provided with illumination.

[BE] 1013.4 Raised character and braille exit signs. *Tactile exit signs shall be required at the following locations:*

1. *Each grade-level exterior exit door that is required to comply with Section 1013.1 shall be identified by a tactile exit sign with the word, "EXIT."*
2. *Each exit door that is required to comply with Section 1013.1, and that leads directly to a grade-level exterior exit by means of a stairway or ramp, shall be identified by a tactile exit sign with the following words, as appropriate:*
   - *2.1. "EXIT STAIR DOWN"*
   - *2.2. "EXIT RAMP DOWN"*
   - *2.3. "EXIT STAIR UP"*
   - *2.4. "EXIT RAMP UP"*
3. *Each exit door that is required to comply with Section 1013.1, and that leads directly to a grade-level exterior exit by means of an exit enclosure or an exit passageway shall be identified by a tactile exit sign with the words, "EXIT ROUTE."*
4. *Each exit access door from an interior room or area to a corridor or hallway that is required to comply with Section 1013.1 shall be identified by a tactile exit sign with the words "EXIT ROUTE."*
5. *Each exit door through a horizontal exit that is required to comply with Section 1013.1 shall be identified by a sign with the words, "TO EXIT."*

Raised characters and braille *exit signs shall comply with Chapter 11B of the California Building Code.*

[BE] 1013.5 Internally illuminated exit signs. Electrically powered, self-luminous and photoluminescent exit signs shall be listed and labeled in accordance with UL 924 and shall be installed in accordance with the manufacturer's instructions and Section 1203. Exit signs shall be illuminated at all times.

1013.5.1 Photoluminescent exit signs. Photoluminescent exit signs shall be provided with an illumination source to charge the exit sign in accordance with the manufacturer's instructions.

[BE] 1013.6 Externally illuminated exit signs. Externally illuminated exit signs shall comply with Sections 1013.6.1 through 1013.6.3.

[BE] 1013.6.1 Graphics. Every exit sign and directional exit sign shall have plainly legible letters not less than 6 inches (152 mm) high with the principal strokes of the letters not less than $^3/_4$ inch (19.1 mm) wide. The word "EXIT" shall have letters having a width not less than 2 inches (51 mm) wide, except the letter "I," and the minimum spacing between letters shall be not less than $^3/_8$ inch (9.5 mm). Signs larger than the minimum established in this section shall have letter widths, strokes and spacing in proportion to their height.

The word "EXIT" shall be in high contrast with the background and shall be clearly discernible when the means of exit sign illumination is or is not energized. If a chevron directional indicator is provided as part of the exit sign, the construction shall be such that the direction of the chevron directional indicator cannot be readily changed.

[BE] 1013.6.2 Exit sign illumination. The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux).

[BE] 1013.6.3 Power source. Exit signs shall be illuminated at all times. To ensure continued illumination for a duration of not less than 90 minutes in case of primary power loss, the sign illumination means shall be connected to an emergency power system provided from storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with Section 1203. Group I-2 exit sign illumination shall not be provided by unit equipment batteries only.

Exception: Approved exit sign illumination types that provide continuous illumination independent of external power sources for a duration of not less than 90 minutes, in case of primary power loss, are not required to be connected to an emergency electrical system.

1013.7 Floor-level exit signs. *Where exit signs are required by Chapter 10, additional approved low-level exit signs which are internally or externally illuminated photoluminescent or self-luminous shall be provided in all interior corridors of Group A, E, I and R-2.1 occupancies and in all areas serving guest rooms of hotels in Group R, Division 1 occupancies.*

Exceptions:

1. *Group A occupancies that are protected throughout by an approved supervised fire sprinkler system.*
2. *Group E occupancies where direct exits have been provided from each classroom.*
3. *Group I and R-2.1 occupancies which are provided with smoke barriers constructed in accordance with Section 407.5 of the California Building Code.*
4. *Group I-3 occupancies.*

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The bottom of the sign shall not be less than 6 inches (152 mm) or more than 8 inches (203 mm) above the floor level and shall indicate the path of exit travel. For exit and exit-access doors, the sign shall be on the door or adjacent to the door with the closest edge of the sign or marker within 4 inches (102 mm) of the door frame.

***Note:** Pursuant to Health and Safety Code Section 13143, this California amendment applies to all newly constructed buildings or structures, subject to this section, for which a building permit is issued (or construction commenced, where no building permit is issued) on or after January 1, 1989.*

***1013.8 Path marking.** When exit signs are required by Chapter 10, in addition to approved floor-level exit signs, approved path marking shall be installed at floor level or no higher than 8 inches (203 mm) above the floor level in all interior-rated exit corridors of unsprinklered Group A, R-1 and R-2 occupancies.*

Such marking shall be continuous, except as interrupted by door-ways, corridors or other such architectural features, in order to provide a visible delineation along the path of travel.

***Note:** Pursuant to Health and Safety Code Section 13143, the California amendments of this section shall apply to all newly constructed buildings or structures, subject to this section, for which a building permit is issued (or construction commenced, where no building permit is issued) on or after January 1, 1989.*

SECTION 1014—HANDRAILS

[BE] 1014.1 Where required. Handrails serving flights of stairways, ramps, stepped aisles and ramped aisles shall be adequate in strength and attachment in accordance with Section 1607.9 of the *California Building Code*. Handrails required for flights of stairways by Section 1011.11 shall comply with Sections 1014.2 through 1014.10. Handrails required for ramps by Section 1012.8 shall comply with Sections 1014.2 through 1014.9. Handrails for stepped aisles and ramped aisles required by Section 1030.16 shall comply with Sections 1014.2 through 1014.9.

[BE] 1014.2 Height. Handrail height, measured from a line connecting the nosings of flights of stairs or finish surface of ramp slope, shall be uniform, not less than 34 inches (864 mm) and not more than 38 inches (965 mm). Handrail height of alternating tread devices and ship's ladders, measured from a line connecting the nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

Exceptions:

1. Where handrail fittings or bendings are used to provide continuous transition between flights, the fittings or bendings shall be permitted to exceed the maximum height.
2. In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are associated with a Group R-3 occupancy or associated with individual dwelling units in Group R-2 occupancies; where handrail fittings or bendings are used to provide continuous transition between flights, transition at winder treads, transition from handrail to guard, or where used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.
3. Handrails on top of a guard where permitted along stepped aisles and ramped aisles in accordance with Section 1030.16.

[BE] 1014.3 Lateral location. Handrails located outward from the edge of the walking surface of flights of stairways, ramps, stepped aisles and ramped aisles shall be located 6 inches (152.4 mm) or less measured horizontally from the edge of the walking surface. Handrails projecting into the width of the walking surface shall comply with Section 1014.9.

[BE] 1014.4 Handrail graspability. Required handrails shall comply with Section 1014.4.1 or shall provide equivalent graspability.

Exception: In Group R-3 occupancies; within dwelling units in Group R-2 occupancies; and in Group U occupancies that are accessory to a Group R-3 occupancy or accessory to individual dwelling units in Group R-2 occupancies; handrails shall be Type I in accordance with Section 1014.4.1, Type II in accordance with Section 1014.4.2 or shall provide equivalent graspability.

[BE] 1014.4.1 Type I. Handrails with a circular cross section shall have an outside diameter of not less than $1^1/_4$ inches (32 mm) and not greater than 2 inches (51 mm). Where the handrail is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than $6^1/_4$ inches (160 mm) with a maximum cross-sectional dimension of $2^1/_4$ inches (57 mm) and minimum cross-sectional dimension of 1 inch (25 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.4.2 Type II. Handrails with a perimeter greater than $6^1/_4$ inches (160 mm) shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of $^3/_4$ inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than $^5/_{16}$ inch (8 mm) within $^7/_8$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $^3/_8$ inch (10 mm) to a level that is not less than $1^3/_4$ inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than $1^1/_4$ inches (32 mm) to not greater than $2^3/_4$ inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

[BE] 1014.5 Continuity. Handrail gripping surfaces shall be continuous, without interruption by newel posts or other obstructions.

Exceptions:

1. Within a dwelling unit that is not an Accessible unit or Type A unit, the continuity of handrail gripping surfaces is allowed to be interrupted by a newel post at a turn or landing.
2. Within a dwelling unit, the use of a volute, turnout, starting easing or starting newel is allowed over the lowest tread.
3. Handrail brackets or balusters attached to the bottom surface of the handrail that do not project horizontally beyond the sides of the handrail within $1^1/_2$ inches (38 mm) of the bottom of the handrail shall not be considered obstructions. For

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each $^1/_2$ inch (12.7 mm) of additional handrail perimeter dimension above 4 inches (102 mm), the vertical clearance dimension of $1^1/_2$ inches (38 mm) shall be permitted to be reduced by $^1/_8$ inch (3.2 mm).

4. Where handrails are provided along walking surfaces with slopes not steeper than 1:20, the bottoms of the handrail gripping surfaces shall be permitted to be obstructed along their entire length where they are integral to crash rails or bumper guards.
5. Handrails serving stepped aisles or ramped aisles are permitted to be discontinuous in accordance with Section 1030.16.1.

[BE] 1014.6 Fittings. Handrails shall not rotate within their fittings.

[BE] 1014.7 Handrail extensions. Handrails shall return to a wall, guard or the walking surface or shall be continuous to the handrail of an adjacent flight of stairs or ramp run. Where handrails are not continuous between flights, the handrails shall extend horizontally not less than 12 inches (305 mm) beyond the top landing nosing and continue to slope for the depth of one tread beyond the bottom tread nosing. At ramps where handrails are not continuous between runs, the handrails shall extend horizontally above the landing 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. The extensions of handrails shall be in the same direction of the flights of stairs at stairways and the ramp runs at ramps and shall extend the required minimum length before any change in direction or decrease in the clearance required by Section 1014.5 or 1014.8.

Exceptions:

1. Handrails within a dwelling unit that is not required to be accessible need extend only from the top riser to the bottom riser.
2. Handrails serving aisles in rooms or spaces used for assembly purposes are permitted to comply with the handrail extensions in accordance with Section 1030.16.
3. Handrails for alternating tread devices and ship's ladders are permitted to terminate at a location vertically above the top and bottom risers. Handrails for alternating tread devices are not required to be continuous between flights or to extend beyond the top or bottom risers.

[BE] 1014.8 Clearance. Clear space between a handrail and a wall or other surface shall be not less than $1^1/_2$ inches (38 mm). A handrail and a wall or other surface adjacent to the handrail shall be free of any sharp or abrasive elements.

Exceptions:

1. A decrease in the clearance due to the curvature or angle of handrail returns shall be allowed.
2. Mounting flanges not more than $^1/_2$-inch (12.7 mm) in thickness at the returned ends of handrails shall be allowed.

[BE] 1014.9 Projections. On ramps and on ramped aisles that are part of an accessible route, the clear width between handrails shall be 36 inches (914 mm) minimum. Projections into the required width of aisles, stairways and ramps at each side shall not exceed $4^1/_2$ inches (114 mm) at or below the handrail height. Projections into the required width shall not be limited above the minimum headroom height required in Section 1011.3. Projections due to intermediate handrails shall not constitute a reduction in the egress width. Where a pair of intermediate handrails are provided within the stairway width without a walking surface between the pair of intermediate handrails and the distance between the pair of intermediate handrails is greater than 6 inches (152 mm), the available egress width shall be reduced by the distance between the closest edges of each such intermediate pair of handrails that is greater than 6 inches (152 mm).

In Group I-2 occupancies, ramps required for exit access shall not be less than 8 feet in width and handrails are permitted to protrude $3^1/_2$ inches from the wall on both sides. For ramps used as exits and stairways used for the movement of bed and litter patients, the clear width between handrails shall be 44 inches (1118 mm) minimum.

[BE] 1014.10 Intermediate handrails. Stairways shall have intermediate handrails located in such a manner that all portions of the stairway minimum width or required capacity are within 30 inches (762 mm) of a handrail. On monumental stairs, handrails shall be located along the most direct path of egress travel.

SECTION 1015—GUARDS

[BE] 1015.1 General. Guards shall comply with the provisions of Sections 1015.2 through 1015.7. Operable windows with sills located more than 72 inches (1829 mm) above finished grade or other surface below shall comply with Section 1015.8.

[BE] 1015.2 Where required. Guards shall be located along open-sided walking surfaces, such as mezzanines, equipment platforms, aisles, stairs, ramps and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of occupiable roofs. Guards shall be adequate in strength and attachment in accordance with Section 1607.9 of the *California Building Code*.

Exception: Guards are not required for the following locations:

1. On the loading side of loading docks or piers.
2. On the audience side of stages and raised platforms, including stairs leading up to the stage and raised platforms.
3. On raised stage and platform floor areas, such as runways, ramps and side stages used for entertainment or presentations.
4. At vertical openings in the performance area of stages and platforms.
5. At elevated walking surfaces appurtenant to stages and platforms for access to and utilization of special lighting or equipment.
6. Along vehicle service pits not accessible to the public.

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7. In assembly seating areas at cross aisles in accordance with Section 1030.17.2.
8. On the loading side of station platforms on fixed guideway transit or passenger rail systems.
9. Portions of an occupiable roof located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where approved guards are present at the perimeter of the roof.
10. At portions of an occupiable roof where an approved barrier is provided.
11. *Elevated facility observation station access hatches at detention facilities.*

[BE] 1015.2.1 Glazing. Where glass is used to provide a guard or as a portion of the guard system, the guard shall comply with Section 2407 of the *California Building Code*. Where the glazing provided does not meet the strength and attachment requirements of Section 1607.9 of the *California Building Code*, complying guards shall be located along glazed sides of open-sided walking surfaces.

[BE] 1015.3 Height. Required guards shall be not less than 42 inches (1067 mm) high, measured vertically as follows:

1. From the adjacent walking surfaces.
2. On stairways and stepped aisles, from the line connecting the nosings.
3. On ramps and ramped aisles, from the ramp surface at the guard.

Exceptions:

1. For occupancies in Group R-3 not more than three stories above grade in height and within individual dwelling units in occupancies in Group R-2 not more than three stories above grade in height with separate means of egress, required guards shall be not less than 36 inches (914 mm) in height measured vertically above the adjacent walking surfaces.
2. For occupancies in Groups R-2 and R-3, within the interior conditioned space of individual dwelling units, where the open-sided walking surface is located not more than 25 feet (7.62 meters) measured vertically to the floor or walking surface below, required guards shall not be less than 36 inches (914 mm) in height measured vertically above the adjacent walking surface.
3. For occupancies in Group R-3, and within individual dwelling units in occupancies in Group R-2, where the top of the guard serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.
4. The guard height in assembly seating areas shall comply with Section 1030.17 as applicable.
5. Along alternating tread devices and ship's ladders, guards where the top rail serves as a handrail shall have height not less than 30 inches (762 mm) and not more than 34 inches (864 mm), measured vertically from a line connecting the leading edge of the treads.
6. In Group F occupancies where exit access stairways serve fewer than three stories and such stairways are not open to the public, and where the top of the guard also serves as a handrail, the top of the guard shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) measured vertically from a line connecting the nosings.

[BE] 1015.4 Opening limitations. Required guards shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter from the walking surface to the required guard height.

Exceptions:

1. From a height of 36 inches (914 mm) to 42 inches (1067 mm), guards shall not have openings that allow passage of a sphere $4^{3}/_{8}$ inches (111 mm) in diameter.
2. The triangular openings at the open sides of a stair, formed by the riser, tread and bottom rail shall not allow passage of a sphere 6 inches (152 mm) in diameter.
3. At elevated walking surfaces for access to and use of electrical, mechanical or plumbing systems or equipment, guards shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
4. In areas that are not open to the public within occupancies in Group I-3, F, H or S, and for alternating tread devices and ship's ladders, guards shall not have openings that allow passage of a sphere 21 inches (533 mm) in diameter.
5. In assembly seating areas, guards required at the end of aisles in accordance with Section 1030.17.4 shall not have openings that allow passage of a sphere 4 inches (102 mm) in diameter up to a height of 26 inches (660 mm). From a height of 26 inches (660 mm) to 42 inches (1067 mm) above the adjacent walking surfaces, guards shall not have openings that allow passage of a sphere 8 inches (203 mm) in diameter.
6. Within individual dwelling units and sleeping units in Group R-2 and R-3 occupancies, guards on the open sides of stairs shall not have openings that allow passage of a sphere $4^{3}/_{8}$ (111 mm) inches in diameter.
7. ***[SFM]*** *In lifeguard towers not open to the public, guards shall not have openings which allow passage of a sphere 21 inches (533 mm) in diameter.*

[BE] 1015.5 Screen porches. Porches and decks that are enclosed with insect screening shall be provided with guards where the walking surface is located more than 30 inches (762 mm) above the floor or grade below.

[BE] 1015.6 Mechanical equipment, systems and devices. Guards shall be provided where various components that require service are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30

inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of such components. The guard shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

Exception: Guards are not required where personal fall arrest anchorage connector devices that comply with ANSI/ASSE Z359.1 are installed.

[BE] 1015.7 Roof access. Guards shall be provided where the roof hatch opening is located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of the hatch parallel to the roof edge. The guard shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

Exception: Guards are not required where personal fall arrest anchorage connector devices that comply with ANSI/ASSE Z359.1 are installed.

[BE] 1015.8 Window openings. Windows in Group R-2 and R-3 buildings including dwelling units, where the bottom of the clear opening of an operable window is located less than 36 inches (914 mm) above the finished floor and more than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, shall comply with one of the following:

1. Where the bottom of the clear opening of the window is located more than 72 inches (1829 mm) and less than 75 feet (22 860 mm) above the finished grade or other surface below on the exterior of the building, the window shall comply with one of the following:
    1.1. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position, provided that the opening is not required for emergency escape or rescue.
    1.2. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
    1.3. Operable windows where the openings are provided with window opening control devices that comply with ASTM F2090. The window opening control device, after operation to release the control device allowing the window to fully open, shall not reduce the minimum net clear opening area of the window unit to less than the area required by Section 1031.3.1 for emergency escape and rescue openings.
2. Where the bottom of the clear opening of the window is located 75 feet (22,860 mm) or more above the finished grade or other surface below on the exterior of the building, the window shall comply with one of the following:
    2.1. Operable windows where the openings are provided with window fall prevention devices that comply with ASTM F2090.
    2.2. Operable windows where the openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the window is in its largest opened position.
    2.3. Window fall prevention devices that comply with ASTM F2006.

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SECTION 1016—EXIT ACCESS

[BE] 1016.1 General. The exit access shall comply with the applicable provisions of Sections 1003 through 1015. Exit access arrangement shall comply with Sections 1016 through 1021.

[BE] 1016.2 Egress through intervening spaces. Egress through intervening spaces shall comply with this section.

1. Exit access through an enclosed elevator lobby is permitted *in other than a Group I-2.* Where access to two or more exits or exit access doorways is required in Section 1006.2.1, access to not less than one of the required exits shall be provided without travel through the enclosed elevator lobbies required by Section 3006 of the *California Building Code*. Where the path of exit access travel passes through an enclosed elevator lobby the level of protection required for the enclosed elevator lobby is not required to be extended to the exit unless direct access to an exit is required by other sections of this code.
2. In other than Group H occupancies, egress from a room or space is allowed to pass through adjoining or intervening rooms or areas provided that such adjoining rooms or areas and the area served are accessory to one or the other and provide a discernible path of egress travel to an exit.
3. In Group H occupancies, egress from a room or space is allowed to pass through adjoining or intervening rooms or areas provided that such adjoining rooms or areas are the same or lesser hazard occupancy group and provide a discernible path of egress travel to an exit.
4. An exit access shall not pass through a room that can be locked to prevent egress.

    Exception: An electrically locked exit access door providing egress from an elevator lobby shall be permitted in accordance with Section 1010.2.14.
5. Means of egress from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
6. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes.

    Exceptions:
    1. Means of egress are not prohibited through a kitchen area serving adjoining rooms constituting part of the same dwelling unit or sleeping unit.
    2. Means of egress are not prohibited through stockrooms in Group M occupancies where all of the following are met:
        2.1. The stock is of the same hazard classification as that found in the main retail area.
        2.2. Not more than 50 percent of the exit access is through the stockroom.

2.3. The stockroom is not subject to locking from the egress side.

2.4. There is a demarcated, minimum 44-inch-wide (1118 mm) aisle defined by full- or partial-height fixed walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstructions.

7. The means of egress shall not pass through any room subject to locking except in Group I-3 occupancies classified as detention facilities and psychiatric treatment areas in Group I-2 occupancies.

[BE] 1016.2.1 Multiple tenants. Where more than one tenant occupies any one floor of a building or structure, each tenant space, dwelling unit and sleeping unit shall be provided with access to the required exits without passing through adjacent tenant spaces, dwelling units and sleeping units.

Exception: The means of egress from a smaller tenant space shall not be prohibited from passing through a larger adjoining tenant space where such rooms or spaces of the smaller tenant occupy less than 10 percent of the area of the larger tenant space through which they pass; are the same or similar occupancy group; a discernable path of egress travel to an exit is provided; and the means of egress into the adjoining space is not subject to locking from the egress side. A required means of egress serving the larger tenant space shall not pass through the smaller tenant space or spaces.

SECTION 1017—EXIT ACCESS TRAVEL DISTANCE

[BE] 1017.1 General. Travel distance within the exit access portion of the means of egress system shall be in accordance with this section.

[BE] 1017.2 Limitations. Exit access travel distance shall not exceed the values given in Table 1017.2.

[BE] TABLE 1017.2—EXIT ACCESS TRAVEL DISTANCE[a]

OCCUPANCY	WITHOUT AUTOMATIC SPRINKLER SYSTEM (feet)	WITH AUTOMATIC SPRINKLER SYSTEM (feet)
A, E, F-1, M, R, S-1	200	250[b, e]
R-2.1	Not Permitted	250[b]
B	200	300[c]
F-2, S-2, U	300	400[c]
H-1	Not Permitted	75[d]
H-2	Not Permitted	100[d]
H-3	Not Permitted	150[d]
H-4	Not Permitted	175[d]
H-5	Not Permitted	200[c]
I-2, I-3[f]	Not Permitted	200[c]
I-4	150	200[c]
L	*Not Permitted*	*200[c]*

For SI: 1 foot = 304.8 mm.

a. See the following sections for modifications to exit access travel distance requirements:
Section 402.8 of the *California Building Code*: For the distance limitation in malls.
Section 407.4 of the *California Building Code*: For the distance limitation in Group I-2.
Section 408.3.10 of the California Building Code: For increased limitation in Group I-3.
Sections 408.6.1 and 408.8.1 of the *California Building Code*: For the distance limitations in Group I-3.
Section 411.2 of the *California Building Code*: For the distance limitation in special amusement areas.
Section 412.6 of the *California Building Code*: For the distance limitations in aircraft manufacturing facilities.
Section 422.3.4 of the California Building Code: For the distance limitation in ambulatory care facilities.
Section 1006.2.2.2: For the distance limitation in refrigeration machinery rooms.
Section 1006.2.2.3: For the distance limitation in refrigerated rooms and spaces.
Section 1006.3.4: For buildings with one exit.
Section 1017.2.2: For increased distance limitation in Groups F-1 and S-1.
Section 1017.2.3: For increased distance limitation in Group H-5.
Section 1030.7: For increased limitation in assembly seating.
Section 3103.4 of the *California Building Code*: For temporary structures.
Section 3104.9 of the *California Building Code*: For pedestrian walkways.

b. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2. See Section 903 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.2.

c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

d. Group H occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.2.5.1.

e. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.

f. Not permitted in nonsprinklered Group I-3 occupancies.

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[BE] 1017.2.1 Exterior egress balcony increase. Exit access travel distances specified in Table 1017.2 shall be increased up to an additional 100 feet (30 480 mm) provided that the last portion of the exit access leading to the exit occurs on an exterior egress balcony constructed in accordance with Section 1021. The length of such balcony shall be not less than the amount of the increase taken.

[BE] 1017.2.2 Groups F-1 and S-1 increase. The maximum exit access travel distance shall be 400 feet (122 m) in Group F-1 or S-1 occupancies where all of the following conditions are met:

1. The portion of the building classified as Group F-1 or S-1 is limited to one story in height.
2. The minimum height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet (7315 mm).
3. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

[BE] 1017.2.3 Group H-5 increase. The maximum exit access travel distance shall be 300 feet (91 m) in the fabrication areas of Group H-5 occupancies where all of the following conditions are met:

1. The width of the fabrication area is 300 feet (91 m) or greater.
2. The area of the fabrication area is 220,000 square feet (18 600 m^2) or greater.
3. The height of the fabrication area, measured between the raised metal floor and the clean filter ceiling, is 16 feet (48 768 mm) or greater.
4. The supply ventilation rate is 20 cubic feet per minute per square foot (0.556 $m^3/min/m^2$) or greater and shall remain operational.

[BE] 1017.3 Measurement. Exit access travel distance shall be measured from the most remote point of each room, area or space along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an exit. Where more than one exit is required, exit access travel distance shall be measured to the nearest exit.

Exceptions:

1. In open parking garages, exit access travel distance is permitted to be measured to the closest riser of an exit access stairway or the closest slope of an exit access ramp.
2. In smoke-protected seating and open-air assembly seating, exit access travel distance shall be measured in accordance with Section 1030.7.

[BE] 1017.3.1 Exit access stairways and ramps. Travel distance on exit access stairways or ramps shall be included in the exit access travel distance measurement. The measurement along stairways shall be made on a plane parallel and tangent to the stair tread nosings in the center of the stair and landings. The measurement along ramps shall be made on the walking surface in the center of the ramp and landings.

1017.3.2 Atriums. Exit access travel distance for areas open to an atrium shall comply with the requirements of Sections 1017.3.2.1 through 1017.3.2.3.

1017.3.2.1 Egress not through the atrium. Where required access to the exits is not through the atrium, exit access travel distance shall comply with Section 1017.2.

1017.3.2.2 Exit access travel distance at the level of exit discharge. Where the path of egress travel is through an atrium space, exit access travel distance at the level of exit discharge shall be determined in accordance with Section 1017.2.

1017.3.2.3 Exit access travel distance at other than the level of exit discharge. Where the path of egress travel is not at the level of exit discharge from the atrium, that portion of the total permitted exit access travel distance that occurs within the atrium shall be not greater than 200 feet (60 960 mm).

SECTION 1018—AISLES

[DSA-AC] *In addition to the requirements of this section, means of egress, which provide access to, or egress from, buildings or facilities where accessibility is required for applications listed in Section 1.9.1 regulated by the Division of the State Architect-Access Compliance, shall also comply with Chapter 11A or Chapter 11B, Section 403, as applicable.*

[BE] 1018.1 General. Aisles and aisle accessways serving as a portion of the exit access in the means of egress system shall comply with the requirements of this section. Aisles or aisle accessways shall be provided from all occupied portions of the exit access that contain seats, tables, furnishings, displays and similar fixtures or equipment. The minimum width or required capacity of aisles shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

[California Code of Regulations, Title 19, Division 1, §3.06(a)] Bonding of Chairs and Spacing of Tables.

(a) Bonding of chairs. In every Group A and Group E occupancy, all loose seats, folding chairs or similar seating facilities that are not fixed to the floor shall be bonded together in groups of not less than three.

Exceptions:

(1) When not more than 200 such seats, chairs or facilities are provided, bonding thereof may be deleted.

(2) The bonding of chairs shall not be required when tables are provided, as when the occupancy is used for dining or similar purposes.

(3) Upon approval of the enforcing agency, the bonding of chairs shall not be required when the placement and location of such chairs does not obstruct any required exit or any line of egress toward required exits and does not constitute a fire hazard as defined in California Code of Regulations, Title 19, Division 1, Section 3.14.

[California Code of Regulations, Title 19, Division 1, §3.06(b)] Bonding of Chairs and Spacing of Tables.

(b) Spacing of Tables. In occupancies having rectangular conference or banquet-type tables, such tables shall be placed not less than 54 inches apart and not less than 36 inches from walls.

[BE] 1018.2 Aisles in assembly spaces. Aisles and aisle accessways serving a room or space used for assembly purposes shall comply with Section 1030.

[BE] 1018.3 Aisles in Groups B and M. In Group B and M occupancies, the minimum clear aisle width shall be determined by Section 1005.1 for the occupant load served, but shall be not less than that required for corridors by Section 1020.3.

Exception: Nonpublic aisles serving less than 50 people and not required to be accessible by Chapter *11A or 11B* of the *California Building Code* need not exceed 28 inches (711 mm) in width.

[BE] 1018.4 Aisle accessways in Group M. An aisle accessway shall be provided on not less than one side of each element within the merchandise pad. The minimum clear width for an aisle accessway not required to be accessible shall be 30 inches (762 mm). The required clear width of the aisle accessway shall be measured perpendicular to the elements and merchandise within the merchandise pad. The 30-inch (762 mm) minimum clear width shall be maintained to provide a path to an adjacent aisle or aisle accessway. The common path of egress travel shall not exceed 30 feet (9144 mm) from any point in the merchandise pad.

Exception: For areas serving not more than 50 occupants, the common path of egress travel shall not exceed 75 feet (22 860 mm).

[BE] 1018.5 Aisles in other than assembly spaces and Groups B and M. In other than rooms or spaces used for assembly purposes and Group B and M occupancies, the minimum clear aisle capacity shall be determined by Section 1005.1 for the occupant load served, but the width shall be not less than that required for corridors by Section 1020.3.

Exception: Nonpublic aisles serving less than 50 people and not required to be accessible by Chapter 11 of the *California Building Code* need not exceed 28 inches (711 mm) in width.

SECTION 1019—EXIT ACCESS STAIRWAYS AND RAMPS

[BE] 1019.1 General. Exit access stairways and ramps serving as an exit access component in a means of egress system shall comply with the requirements of this section. The number of stories connected by exit access stairways and ramps shall include basements, but not mezzanines.

[BE] 1019.2 All occupancies. Exit access stairways and ramps that serve floor levels within a single story are not required to be enclosed.

[BE] 1019.3 Occupancies other than Groups I-2, I-3 and *R-2.1*. In other than Group I-2, I-3 and *R-2.1* occupancies, floor openings containing exit access stairways or ramps shall be enclosed with a shaft enclosure constructed in accordance with Section 713 of the *California Building Code*.

Exceptions:

1. Exit access stairways and ramps within a two-story opening complying with Section 712.1.9 of the *California Building Code.*
2. In Group R-1, R-2, *R-2.1, R-2.2,* or R-3 *or R-3.1* occupancies, exit access stairways and ramps connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. Exit access stairways serving and contained within a Group R-3 congregate residence or a Group R-4 facility are not required to be enclosed.
4. Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.
5. Exit access stairways and ramps within an atrium complying with the provisions of Section 404 of the *California Building Code*.
6. Exit access stairways and ramps in open parking garages that serve only the parking garage.
7. Exit access stairways and ramps serving smoke-protected or open-air assembly seating complying with the exit access travel distance requirements of Section 1030.7.
8. Exit access stairways and ramps between the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.
9. Exterior exit access stairways or ramps between occupiable roofs.
10. *Fixed guideway transit stations, constructed in accordance with Section 443 of the California Building Code.*

[BE] 1019.4 Group I-2, I-3 and *R-2.1* occupancies. In Group I-2, I-3 and *R-2.1* occupancies, floor openings between stories containing exit access stairways or ramps are required to be enclosed with a shaft enclosure constructed in accordance with Section 713 of the *California Building Code*.

Exception: In Group I-3 occupancies, exit access stairways or ramps constructed in accordance with Section 408 of the *California Building Code* are not required to be enclosed.

SECTION 1020—CORRIDORS

[BE] 1020.1 General. Corridors serving as an exit access component in a means of egress system shall comply with the requirements of Sections 1020.2 and 1020.7.

[BE] 1020.2 Construction. Corridors shall be fire-resistance rated in accordance with Table 1020.2. The corridor walls required to be fire-resistance rated shall comply with Section 708 of the *California Building Code* for fire partitions.

Exceptions:

1. A fire-resistance rating is not required for corridors in an occupancy in Group E where each room that is used for instruction has not less than one door opening directly to the exterior and rooms for assembly purposes have not less than one-half of the required means of egress doors opening directly to the exterior. Exterior doors specified in this exception are required to be at ground level.
2. A fire-resistance rating is not required for corridors contained within a dwelling unit or sleeping unit in an occupancy in Groups I-1 and R.
3. A fire-resistance rating is not required for corridors in open parking garages.
4. A fire-resistance rating is not required for corridors in an occupancy in Group B that is a space requiring only a single means of egress complying with Section 1006.2.
5. Corridors adjacent to the exterior walls of buildings shall be permitted to have unprotected openings on unrated exterior walls where unrated walls are permitted by Table 705.5 of the *California Building Code* and unprotected openings are permitted by Table 705.9 of the *California Building Code*.
6. *A fire-resistance rating is not required for corridors within suites in a Group I-2 constructed in accordance with Section 407.4.4 or 407.4.5 of the California Building Code.*

[BE] TABLE 1020.2—CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	OCCUPANT LOAD SERVED BY CORRIDOR	REQUIRED FIRE-RESISTANCE RATING (hours)	
		Without automatic sprinkler system	With automatic sprinkler system
H-1, H-2, H-3	All	Not Permitted	1[c]
H-4, H-5*, I*	Greater than 30	Not Permitted	1[c]
A[e], B, E, F, M, S, U	Greater than 30	1	0
R-*1, R-2, R-2.2, R-3*[d]*, R-3.1, R-4*[d]	Greater than 10	Not Permitted	*1*
I-2[a]	*Greater than 6*	*1*	*1*
I-3, *R-2.1*	*Greater than 6*	Not Permitted	1[b, c]
I-4	All	1	*1*

a. For requirements for occupancies in Group I-2, see Sections 407.2 and 407.3 of the *California Building Code*.
b. For a reduction in the fire-resistance rating for occupancies in Group I-3, see Section 408.8 of the *California Building Code*.
c. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 where allowed.
d. Group R-3 and R-4 buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.3. See Section 903.2.8 for occupancies where automatic sprinkler systems are permitted in accordance with Section 903.3.1.3.
e. ***[SFM]*** *See Section 1030.*

[BE] 1020.2.1 Hoistway protection. Elevator hoistway doors in elevators hoistway enclosures required to be fire-resistance rated shall be protected in accordance with Section 716 of the *California Building Code*.

Elevator hoistway doors shall also be protected in accordance with Section 3006.2 of the *California Building Code*.

[BE] 1020.3 Width and capacity. The required capacity of corridors shall be determined as specified in Section 1005.1, but the minimum width shall be not less than that specified in Table 1020.3.

Exception: In Group I-2 occupancies, corridors are not required to have a clear width of 96 inches (2438 mm) in areas where there will not be stretcher or bed movement for access to care or as part of the defend-in-place strategy.

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[BE] TABLE 1020.3—MINIMUM CORRIDOR WIDTH	
OCCUPANCY	**MINIMUM WIDTH (inches)**
Any facility not listed below	44
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24
With an occupant load of less than 50	36
Within a dwelling unit	36
In Group E with a corridor having a occupant load of 100 or more	72
In corridors and areas serving stretcher traffic in ambulatory care facilities	72
Group I-2 *and I-3* in areas where required for bed movement	96
Corridors in Group I-2 and I-3 occupancies serving any area caring for one or more nonambulatory persons[a]	*72*

For SI: 1 inch = 25.4 mm.
a. See California Building Code Section 1224.4.7.1 for Group I-2.

[BE] 1020.4 Obstruction. The minimum width or required capacity of corridors shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

[BE] 1020.5 Dead ends. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that dead-end corridors do not exceed 20 feet (6096 mm) in length.

Exceptions:

1. In Group I-3, Condition 2, 3 or 4 occupancies, the dead end in a corridor shall not exceed 50 feet (15 240 mm).
2. In occupancies in Groups B, E, F, M, R-1, R-2, *R-2.1, R-2.2,* S and U, where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the length of the dead-end corridors shall not exceed 50 feet (15 240 mm). ⬅
3. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.
4. In Group I-2 occupancies, *where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1,* the length of dead-end corridors that do not serve patient rooms or patient treatment spaces shall not exceed 30 feet (9144 mm).

[BE] 1020.6 Air movement in corridors. Corridors shall not serve as supply, return, exhaust, relief or ventilation air ducts.

Exceptions:

1. Use of a corridor as a source of makeup air for exhaust systems in *small* rooms *of 30 square feet or less* that open directly onto such corridors, including toilet rooms, bathrooms, dressing rooms, smoking lounges and janitor closets, shall be permitted, provided that each such corridor is directly supplied with outdoor air at a rate greater than the rate of makeup air taken from the corridor.
2. Where located within a dwelling unit, the use of corridors for conveying return air shall not be prohibited.
3. Where located within tenant spaces of 1,000 square feet (93 m^2) or less in area, utilization of corridors for conveying return air is permitted.
4. Transfer air movement required to maintain the pressurization difference within health care facilities *and Group L occupancies,* in accordance with ASHRAE 170.
5. *For health care facilities under the jurisdiction of the Office of Statewide Hospital Planning and Development (OSHPD), see the California Mechanical Code.* ||

[BE] 1020.6.1 Corridor ceiling. Use of the space between the corridor ceiling and the floor or roof structure above as a return air plenum is permitted for one or more of the following conditions:

1. The corridor is not required to be of fire-resistance-rated construction.
2. The corridor is separated from the plenum by fire-resistance-rated construction.
3. The air-handling system serving the corridor is shut down upon activation of the air-handling unit smoke detectors required by the *California Mechanical Code*.
4. The air-handling system serving the corridor is shut down upon detection of sprinkler water flow where the building is equipped throughout with an automatic sprinkler system.
5. The space between the corridor ceiling and the floor or roof structure above the corridor is used as a component of an approved engineered smoke control system.

[BE] 1020.7 Corridor continuity. Fire-resistance-rated corridors shall be continuous from the point of entry to an exit, and shall not be interrupted by intervening rooms. Where the path of egress travel within a fire-resistance-rated corridor to the exit includes travel

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along unenclosed exit access stairways or ramps, the fire-resistance-rating shall be continuous for the length of the stairway or ramp and for the length of the connecting corridor on the adjacent floor leading to the exit.

Exceptions:

1. Foyers, lobbies or reception rooms constructed as required for corridors shall not be construed as intervening rooms.
2. Enclosed elevator lobbies as permitted by Item 1 of Section 1016.2 shall not be construed as intervening rooms.
3. ***[SFM]*** *In fully sprinklered office buildings, corridors may lead through enclosed elevator lobbies if all areas of the building have access to at least one required exit without passing through the elevator lobby.*

SECTION 1021—EGRESS BALCONIES

[BE] 1021.1 General. Balconies used for egress purposes shall conform to the same requirements as corridors for minimum width, required capacity, headroom, dead ends and projections.

[BE] 1021.2 Wall separation. Exterior egress balconies shall be separated from the interior of the building by walls and opening protectives as required for corridors.

Exception: Separation is not required where the exterior egress balcony is served by not less than two stairways and a dead-end travel condition does not require travel past an unprotected opening to reach a stairway.

[BE] 1021.3 Openness. The long side of an egress balcony shall be not less than 50 percent open, and the open area above the guards shall be so distributed as to minimize the accumulation of smoke or toxic gases.

[BE] 1021.4 Location. Exterior egress balconies shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the egress balcony to the following:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 of the *California Building Code* based on fire separation distance.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

SECTION 1022—EXITS

[BE] 1022.1 General. Exits shall comply with Sections 1022 through 1027 and the applicable requirements of Sections 1003 through 1015. An exit shall not be used for any purpose that interferes with its function as a means of egress. Once a given level of exit protection is achieved, such level of protection shall not be reduced until arrival at the exit discharge. Exits shall be continuous from the point of entry into the exit to the exit discharge.

[BE] 1022.2 Exterior exit doors. Buildings or structures used for human occupancy shall have not less than one exterior door that meets the requirements of Section 1010.1.1.

[BE] 1022.2.1 Detailed requirements. Exterior exit doors shall comply with the applicable requirements of Section 1010.1.

[BE] 1022.2.2 Arrangement. Exterior exit doors shall lead directly to the exit discharge or the public way.

1022.3 Basement exits in Group I-2 occupancies. *For additional requirements for occupancies in Group I-2, see Section 407.4.1.2 of the California Building Code.*

SECTION 1023—INTERIOR EXIT STAIRWAYS AND RAMPS

[BE] 1023.1 General. Interior exit stairways and ramps serving as an exit component in a means of egress system shall comply with the requirements of this section. Interior exit stairways and ramps shall be enclosed and lead directly to the exterior of the building or shall be extended to the exterior of the building with an exit passageway conforming to the requirements of Section 1024, except as permitted in Section 1028.2. An interior exit stairway or ramp shall not be used for any purpose other than as a means of egress and a circulation path.

[BE] 1023.2 Construction. Enclosures for interior exit stairways and ramps shall be constructed as fire barriers in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both. Interior exit stairway and ramp enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the interior exit stairways or ramps shall include any basements, but not any mezzanines. Enclosure for interior exit stairways and ramps shall have a fire-resistance rating not less than the floor assembly penetrated, but need not exceed 2 hours.

Exceptions:

1. Interior exit stairways and ramps in Group I-3 occupancies in accordance with the provisions of Section 408.3.8 of the *California Building Code*.
2. Interior exit stairways within an atrium enclosed in accordance with Section 404.6 of the *California Building Code*.
3. Interior exit stairways in accordance with Section 510.2 of the *California Building Code*.
4. *Fixed guideway transit stations, constructed in accordance with Section 443 of the California Building Code.*

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[BE] 1023.3 Termination. Interior exit stairways and ramps shall terminate at an exit discharge or a public way.

Exception: A combination of interior exit stairways, interior exit ramps and exit passageways, constructed in accordance with Sections 1023.2, 1023.3.1 and 1024, respectively, and forming a continuous protected enclosure, shall be permitted to extend an interior exit stairway or ramp to the exit discharge or a public way.

[BE] 1023.3.1 Extension. Where interior exit stairways and ramps are extended to an exit discharge or a public way by an exit passageway, the interior exit stairway and ramp shall be separated from the exit passageway by a fire barrier constructed in accordance with Section 707 of the *California Building Code* or a horizontal assembly constructed in accordance with Section 711 of the *California Building Code*, or both. The fire-resistance rating shall be not less than that required for the interior exit stairway and ramp. A fire door assembly complying with Section 716 of the *California Building Code* shall be installed in the fire barrier to provide a means of egress from the interior exit stairway and ramp to the exit passageway. Openings in the fire barrier other than the fire door assembly are prohibited. Penetrations of the fire barrier are prohibited.

Exceptions:

1. Penetrations of the fire barrier in accordance with Section 1023.5 shall be permitted.
2. Separation between an interior exit stairway or ramp and the exit passageway extension shall not be required where there are no openings into the exit passageway extension.
3. Separation between an interior exit stairway or ramp and the exit passageway extension shall not be required where the interior exit stairway and the exit passageway extension are pressurized in accordance with Section 909.20.4 of the *California Building Code*.

[BE] 1023.4 Openings. Interior exit stairway and ramp opening protectives shall be in accordance with the requirements of Section 716 of the *California Building Code*.

Openings in interior exit stairways and ramps other than unprotected exterior openings shall be limited to those required for exit access to the enclosure from normally occupied spaces and for egress from the enclosure.

Elevators shall not open into interior exit stairways and ramps.

[BE] 1023.5 Penetrations. Penetrations into or through interior exit stairways and ramps are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. Fire protection systems.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication systems.
6. Electrical raceway serving the interior exit stairway and ramp and terminating at a steel box not exceeding 16 square inches ($0.010\ m^2$).
7. Structural elements, such as beams or joists, supporting the interior exit stairway or ramp or enclosure.
8. Structural elements, such as beams or joists, supporting a roof at the top of the interior exit stairway or ramp.

Such penetrations shall be protected in accordance with Section 714 of the *California Building Code*. There shall not be penetrations or communication openings, whether protected or not, between adjacent interior exit stairways and ramps.

Exception: Membrane penetrations shall be permitted on the outside of the interior exit stairway and ramp. Such penetrations shall be protected in accordance with Section 714.4.2 of the *California Building Code*.

[BE] 1023.6 Ventilation. Equipment and ductwork for interior exit stairway and ramp ventilation as permitted by Section 1023.5 shall comply with one of the following items:

1. Such equipment and ductwork shall be located exterior to the building and shall be directly connected to the interior exit stairway and ramp by ductwork enclosed in construction as required for shafts.
2. Where such equipment and ductwork is located within the interior exit stairway and ramp, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or such air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, such equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 of the *California Building Code* for shaft enclosures.

The interior exit stairway and ramp ventilation systems shall be independent of other building ventilation systems.

[BE] 1023.7 Interior exit stairway and ramp exterior walls. Exterior walls of the interior exit stairway or ramp shall comply with the requirements of Section 705 of the *California Building Code* for exterior walls. Where nonrated walls or unprotected openings enclose the exterior of the stairway or ramps and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), building construction within 10 feet (3048 mm) of the exterior walls of the interior exit stairway or ramp shall comply with Sections 1023.7.1 and 1023.7.2.

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[BE] 1023.7.1 Building exterior walls. Building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening in an interior exit stairway or ramp shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than $^3/_4$ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the topmost landing of the stairway or ramp, or to the roof line, whichever is lower.

[BE] 1023.7.2 Roof assemblies. Where the interior exit stairway or ramp extends above an adjacent roof of the same building, the adjacent roof assembly shall have a fire-resistance rating of not less than 1 hour and openings shall be protected by opening protectives having a fire protection rating of not less than $^3/_4$ hour. The fire-resistance rating and opening protection shall extend horizontally not less than 10 feet (3048 mm) from the exterior wall of the stairway or ramp, or to the perimeter of the adjacent roof, whichever is less.

Exceptions:

1. The roof assembly need not be rated and openings in the roof need not be protected where they are adjacent to the penthouse of the stairway or ramp, unless otherwise required by this code.
2. The adjacent roof assembly need not be rated and adjacent openings in the roof need not be protected where the exterior wall of the stairway or ramp has a fire-resistance rating of 1 hour and openings are protected by opening protectives having a fire protection rating of not less than $^3/_4$ hour, extending not less than 10 feet (3048 mm) above the roof.

[BE] 1023.8 Barriers at level of exit discharge. An interior exit stairway and ramp shall not continue below its level of exit discharge unless an approved barrier is provided at the level of exit discharge to prevent persons from unintentionally continuing into levels below. Directional exit signs shall be provided as specified in Section 1013.

[BE] 1023.9 Stairway identification signs. A sign shall be provided at each floor landing in an interior exit stairway and ramp connecting more than three stories designating the floor level, the terminus of the top and bottom of the interior exit stairway and ramp and the identification of the stairway or ramp. The signage shall state the story of, and the direction to, the exit discharge and the availability of roof access from the interior exit stairway and ramp for the fire department. The bottom of the sign shall be located not less than 5 feet (1524 mm) above the floor landing in a position that is readily visible when the doors are in the open and closed positions.

In addition to the stairway identification sign, raised characters and braille floor identification signs that comply with Chapter 11B of the California Building Code shall be located at the landing of each floor level, placed adjacent to the door on the latch side, in all enclosed stairways in buildings two or more stories in height to identify the floor level. At the exit discharge level, the sign shall include a raised five pointed star located to the left of the identifying floor level. The outside diameter of the star shall be the same as the height of the raised characters.

[BE] 1023.9.1 Signage requirements. Stairway identification signs shall comply with all of the following requirements:

1. The signs shall be a minimum size of 18 inches (457 mm) by 12 inches (305 mm).
2. The letters designating the identification of the *stair enclosure, such as STAIR NO. 1 or WEST STAIR, shall be placed at the top of the sign and* shall be not less than $1^1/_2$ inches (38 mm) in height *block lettering with $^1/_4$-inch (6 mm) strokes.*
3. The number designating the floor level shall be not less than 5 inches (127 mm) in height *with $^3/_4$-inch (19 mm) strokes* and located in the center of the sign. *The mezzanine levels shall have the letter "M" preceding the floor level. basement levels shall have the letter "B" preceding the floor number.*
4. Other lettering and numbers shall be not less than 1 inch (25 mm) in height.
5. *The stairway's upper terminus, such as ROOF ACCESS or NO ROOF ACCESS, shall be placed under the stairway identification in 1-inch-high (25 mm) block lettering with $^1/_4$-inch (6 mm) strokes.*
6. *The lower and upper terminus of the stairway shall be placed at the bottom of the sign in 1-inch-high (25 mm) block lettering with $^1/_4$-inch (6 mm) strokes.*
7. Characters and their background shall have a nonglare finish. Characters shall contrast with their background, with either light characters on a dark background or dark characters on a light background.
8. Where signs required by Section 1023.9 are installed in the interior exit stairways and ramps of buildings subject to Section 1025, the signs shall be made of the same materials as required by Section 1025.4.

[BE] 1023.10 Elevator lobby identification signs. At landings in interior exit stairways where two or more doors lead to the floor level, any door with direct access to an enclosed elevator lobby shall be identified by signage located on the door or directly adjacent to the door stating "Elevator Lobby." Signage shall be in accordance with Section 1023.9.1, Items 4, 5 and 6.

[BE] 1023.11 Tactile floor-level signs. Where floor-level signs are provided in interior exit stairways and ramps, a floor-level sign identifying the floor level in visual characters, raised characters and braille complying with ICC A117.1 shall be located at each floor-level landing adjacent to the door leading from the interior exit stairway and ramp into the corridor.

[BE] 1023.12 Smokeproof enclosures. Where required by Section 403.5.4, 405.7.2 or 412.2.2.1 of the *California Building Code*, interior exit stairways and ramps shall be smokeproof enclosures in accordance with Section 909.20.

[BE] 1023.12.1 Termination and extension. A smokeproof enclosure shall terminate at an exit discharge or a public way. The smokeproof enclosure shall be permitted to be extended by an exit passageway in accordance with Section 1023.3. The exit passageway shall be without openings other than the fire door assembly required by Section 1023.3.1 and those necessary for egress from the exit passageway. The exit passageway shall be separated from the remainder of the building by 2-hour fire barri-

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ers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

Exceptions:

1. Openings in the exit passageway serving a smokeproof enclosure are permitted where the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure, and openings are protected as required for access from other floors.
2. The fire barrier separating the smokeproof enclosure from the exit passageway is not required, provided that the exit passageway is protected and pressurized in the same manner as the smokeproof enclosure.
3. A smokeproof enclosure shall be permitted to egress through areas on the level of exit discharge or vestibules as permitted by Section 1028.

[BE] 1023.12.2 Enclosure access. Access to the stairway or ramp within a smokeproof enclosure shall be by way of a vestibule or an open exterior balcony.

Exception: Access is not required by way of a vestibule or exterior balcony for stairways and ramps using the pressurization alternative complying with Section 909.20.4 of the *California Building Code*.

[BE] 1023.13 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

SECTION 1024—EXIT PASSAGEWAYS

[BE] 1024.1 General. Exit passageways serving as an exit component in a means of egress system shall comply with the requirements of this section. An exit passageway shall not be used for any purpose other than as a means of egress and a circulation path.

[BE] 1024.2 Width and capacity. The required capacity of exit passageways shall be determined as specified in Section 1005.1 but the minimum width shall be not less than 44 inches (1118 mm), except that exit passageways serving an occupant load of less than 50 shall be not less than 36 inches (914 mm) in width. The minimum width or required capacity of exit passageways shall be unobstructed.

Exception: Encroachments complying with Section 1005.7.

The clear width of exit passageways in a Group I-2 occupancy used for the movement of beds and litters shall be 44 inches (1118 mm) minimum.

[BE] 1024.3 Construction. Exit passageway enclosures shall have walls, floors and ceilings of not less than a 1-hour fire-resistance rating, and not less than that required for any connecting interior exit stairway or ramp. Exit passageways shall be constructed as fire barriers in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

[BE] 1024.4 Termination. Exit passageways on the level of exit discharge shall terminate at an exit discharge. Exit passageways on other levels shall terminate at an exit.

[BE] 1024.5 Openings. Exit passageway opening protectives shall be in accordance with the requirements of Section 716 of the *California Building Code*.

Except as permitted in Section 402.8.7 of the *California Building Code*, openings in exit passageways other than unprotected exterior openings shall be limited to those necessary for exit access to the exit passageway from normally occupied spaces and for egress from the exit passageway.

Where an interior exit stairway or ramp is extended to an exit discharge or a public way by an exit passageway, the exit passageway shall comply with Section 1023.3.1.

Elevators shall not open into an exit passageway.

[BE] 1024.6 Penetrations. Penetrations into or through an exit passageway are prohibited except for the following:

1. Equipment and ductwork necessary for independent ventilation or pressurization.
2. Fire protection systems.
3. Security systems.
4. Two-way communication systems.
5. Electrical raceway for fire department communication.
6. Electrical raceway serving the exit passageway and terminating at a steel box not exceeding 16 square inches (0.010 m^2).
7. Structural elements, such as beams or joists, supporting a floor or roof at the top of the exit passageway.

Such penetrations shall be protected in accordance with Section 714 of the *California Building Code*. There shall not be penetrations or communicating openings, whether protected or not, between adjacent exit passageways.

Exception: Membrane penetrations shall be permitted on the outside of the exit passageway. Such penetrations shall be protected in accordance with Section 714.4.2 of the *California Building Code*.

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[BE] 1024.7 Ventilation. Equipment and ductwork for exit passageway ventilation as permitted by Section 1024.6 shall comply with one of the following:

1. The equipment and ductwork shall be located exterior to the building and shall be directly connected to the exit passageway by ductwork enclosed in construction as required for shafts.
2. Where the equipment and ductwork is located within the exit passageway, the intake air shall be taken directly from the outdoors and the exhaust air shall be discharged directly to the outdoors, or the air shall be conveyed through ducts enclosed in construction as required for shafts.
3. Where located within the building, the equipment and ductwork shall be separated from the remainder of the building, including other mechanical equipment, with construction as required for shafts.

In each case, openings into the fire-resistance-rated construction shall be limited to those needed for maintenance and operation and shall be protected by opening protectives in accordance with Section 716 of the *California Building Code* for shaft enclosures.

Exit passageway ventilation systems shall be independent of other building ventilation systems.

[BE] 1024.8 Exit passageway exterior walls. Exterior walls of the exit passageway shall comply with Section 705 of the *California Building Code*. Where nonrated walls or unprotected openings enclose the exterior of the exit passageway and the walls or openings are exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the building exterior walls within 10 feet (3048 mm) horizontally of a nonrated wall or unprotected opening shall have a fire-resistance rating of not less than 1 hour. Openings within such exterior walls shall be protected by opening protectives having a fire protection rating of not less than $^3/_4$ hour. This construction shall extend vertically from the ground to a point 10 feet (3048 mm) above the floor of the exit passageway or to the roof line, whichever is lower.

[BE] 1024.9 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

SECTION 1025—LUMINOUS EGRESS PATH MARKINGS

[BE] 1025.1 General. Approved luminous egress path markings delineating the exit path shall be provided in high-rise buildings of ➡ Group A, B, E, M or R-1 occupancies in accordance with this section.

Exception: Luminous egress path markings shall not be required on the level of exit discharge in lobbies that serve as part of the exit path in accordance with Section 1028.2, Exception 1.

[BE] 1025.2 Markings within exit components. Egress path markings shall be provided in interior exit stairways, interior exit ramps and exit passageways, in accordance with Sections 1025.2.1 through 1025.2.6.3.

[BE] 1025.2.1 Steps. A solid and continuous stripe shall be applied to the horizontal leading edge of each step and shall extend for the full length of the step. Outlining stripes shall have a minimum horizontal width of 1 inch (25 mm) and a maximum width of 2 inches (51 mm). The leading edge of the stripe shall be placed not more than $^1/_2$ inch (12.7 mm) from the leading edge of the step and the stripe shall not overlap the leading edge of the step by not more than $^1/_2$ inch (12.7 mm) down the vertical face of the step.

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.2 Landings. The leading edge of landings shall be marked with a stripe consistent with the dimensional requirements for steps.

[BE] 1025.2.3 Handrails. Handrails and handrail extensions shall be marked with a solid and continuous stripe having a minimum width of 1 inch (25 mm). The stripe shall be placed on the top surface of the handrail for the entire length of the handrail, including extensions and newel post caps. Where handrails or handrail extensions bend or turn corners, the stripe shall not have a gap of more than 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.4 Perimeter demarcation lines. Stair landings and other floor areas within interior exit stairways, interior exit ramps and exit passageways, with the exception of the sides of steps, shall be provided with solid and continuous demarcation lines on the floor or on the walls or a combination of both. The stripes shall be 1 to 2 inches (25 mm to 51 mm) wide with interruptions not exceeding 4 inches (102 mm).

Exception: The minimum width of 1 inch (25 mm) shall not apply to outlining stripes listed in accordance with UL 1994.

[BE] 1025.2.4.1 Floor-mounted demarcation lines. Perimeter demarcation lines shall be placed within 4 inches (102 mm) of the wall and shall extend to within 2 inches (51 mm) of the markings on the leading edge of landings. The demarcation lines shall continue across the floor in front of all doors.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

[BE] 1025.2.4.2 Wall-mounted demarcation lines. Perimeter demarcation lines shall be placed on the wall with the bottom edge of the stripe not more than 4 inches (102 mm) above the finished floor. At the top or bottom of the stairs, demarcation lines shall drop vertically to the floor within 2 inches (51 mm) of the step or landing edge. Demarcation lines on walls shall transition vertically to the floor and then extend across the floor where a line on the floor is the only practical method of outlining the path. Where the wall line is broken by a door, demarcation lines on walls shall continue across the face of the door or transition to the floor and extend across the floor in front of such door.

Exception: Demarcation lines shall not extend in front of exit discharge doors that lead out of an exit and through which occupants must travel to complete the exit path.

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[BE] 1025.2.4.3 Transition. Where a wall-mounted demarcation line transitions to a floor-mounted demarcation line, or vice-versa, the wall-mounted demarcation line shall drop vertically to the floor to meet a complimentary extension of the floor-mounted demarcation line, thus forming a continuous marking.

[BE] 1025.2.5 Obstacles. Obstacles at or below 6 feet 6 inches (1981 mm) in height and projecting more than 4 inches (102 mm) into the egress path shall be outlined with markings not less than 1 inch (25 mm) in width comprised of a pattern of alternating equal bands, of luminous material and black, with the alternating bands not more than 2 inches (51 mm) thick and angled at 45 degrees (0.79 rad). Obstacles shall include, but are not limited to, standpipes, hose cabinets, wall projections, and restricted height areas. However, such markings shall not conceal any required information or indicators including but not limited to instructions to occupants for the use of standpipes.

Exception: The minimum width of 1 inch (25 mm) shall not apply to markings listed in accordance with UL 1994.

[BE] 1025.2.6 Doors within the exit path. Doors through which occupants must pass in order to complete the exit path shall be provided with markings complying with Sections 1025.2.6.1 through 1025.2.6.3.

[BE] 1025.2.6.1 Emergency exit symbol. The doors shall be identified by a low-location luminous emergency exit symbol complying with NFPA 170. The exit symbol shall be not less than 4 inches (102 mm) in height and shall be mounted on the door, centered horizontally, with the top of the symbol not higher than 18 inches (457 mm) above the finished floor.

[BE] 1025.2.6.2 Door hardware markings. Door hardware shall be marked with not less than 16 square inches (10 323 mm^2) of luminous material. This marking shall be located behind, immediately adjacent to, or on the door handle or escutcheon. Where a panic bar is installed, such material shall be not less than 1 inch (25 mm) wide for the entire length of the actuating bar or touchpad.

[BE] 1025.2.6.3 Door frame markings. The top and sides of the door frame shall be marked with a solid and continuous 1-inch- to 2-inch-wide (25 mm to 51 mm) stripe. Where the door molding does not provide sufficient flat surface on which to locate the stripe, the stripe shall be permitted to be located on the wall surrounding the frame.

[BE] 1025.3 Uniformity. Placement and dimensions of markings shall be consistent and uniform throughout the same enclosure.

[BE] 1025.4 Self-luminous and photoluminescent. Luminous egress path markings shall be permitted to be made of any material, including paint, provided that an electrical charge is not required to maintain the required luminance. Such materials shall include, but not be limited to, self-luminous materials and photoluminescent materials. Materials shall comply with either of the following standards:

1. UL 1994.
2. ASTM E2072, except that the charging source shall be 1 footcandle (11 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 milicandelas per square meter at 10 minutes and 5 milicandelas per square meter after 90 minutes.

[BE] 1025.5 Illumination. Where photoluminescent exit path markings are installed, they shall be provided with not less than 1 footcandle (11 lux) of illumination for not less than 60 minutes prior to periods when the building is occupied and continuously during the building occupancy.

SECTION 1026—HORIZONTAL EXITS

[BE] 1026.1 General. Horizontal exits serving as an exit in a means of egress system shall comply with the requirements of this section. A horizontal exit shall not serve as the only exit from a portion of a building, and where two or more exits are required, not more than one-half of the total number of exits or total exit minimum width or required capacity shall be horizontal exits.

Exceptions:

1. Horizontal exits are permitted to comprise two-thirds of the required exits from any building or floor area for occupancies in Group I-2.
2. Horizontal exits are permitted to comprise 100 percent of the exits required for occupancies in Group I-3. Not less than 6 square feet (0.6 m^2) of accessible space per occupant shall be provided on each side of the horizontal exit for the total number of people in adjoining compartments.

[BE] 1026.2 Separation. The separation between buildings or refuge areas connected by a horizontal exit shall be provided by a fire wall complying with Section 706 of the *California Building Code*; or by a fire barrier complying with Section 707 of the *California Building Code* or a horizontal assembly complying with Section 711 of the *California Building Code*, or both. The minimum fire-resistance rating of the separation shall be 2 hours. Opening protectives in horizontal exits shall also comply with Section 716 of the *California Building Code*. Duct and air transfer openings in a fire wall or fire barrier that serves as a horizontal exit shall also comply with Section 717 of the *California Building Code*. The horizontal exit separation shall extend vertically through all levels of the building unless floor assemblies have a fire-resistance rating of not less than 2 hours and do not have unprotected openings.

Exception: A fire-resistance rating is not required at horizontal exits between a building area and an above-grade pedestrian walkway constructed in accordance with Section 3104 of the *California Building Code*, provided that the distance between connected buildings is more than 20 feet (6096 mm).

Horizontal exits constructed as fire barriers shall be continuous from exterior wall to exterior wall so as to divide completely the floor served by the horizontal exit.

[BE] 1026.3 Opening protectives. Fire doors in horizontal exits shall be self-closing or automatic-closing when activated by a smoke detector in accordance with Section 716.2.6.6 of the *California Building Code*. Doors, where located in a cross-corridor condition, shall be automatic-closing by activation of a smoke detector installed in accordance with Section 716.2.6.6 of the *California Building Code*.

[BE] 1026.4 Refuge area. The refuge area of a horizontal exit shall be a space occupied by the same tenant or a public area and each such refuge area shall be adequate to accommodate the original occupant load of the refuge area plus the occupant load anticipated from the adjoining compartment. The anticipated occupant load from the adjoining compartment shall be based on the capacity of the horizontal exit doors entering the refuge area, or the total occupant load of the adjoining compartment, whichever is less.

[BE] 1026.4.1 Capacity. The capacity of the refuge area shall be computed based on a net floor area allowance of 3 square feet (0.2787 m^2) for each occupant to be accommodated therein. Where the horizontal exit also forms a smoke compartment, the capacity of the refuge area for Group I-2, I-3 *and R-2.1* occupancies and Group B ambulatory care facilities shall comply with Sections 407.5.3, 408.6.2, 420.6.1, *420.6.2* and 422.3.2 of the *California Building Code* as applicable.

[BE] 1026.4.2 Number of exits. The refuge area into which a horizontal exit leads shall be provided with exits adequate to meet the occupant requirements of this chapter, but not including the added occupant load imposed by persons entering the refuge area through horizontal exits from other areas. *In other than I-3 occupancies, not* less than one refuge area exit shall lead directly to the exterior or to an interior exit stairway or ramp.

Exception: The adjoining compartment shall not be required to have a stairway or door leading directly outside, provided that the refuge area into which a horizontal exit leads has stairways or doors leading directly outside and are so arranged that egress shall not require the occupants to return through the compartment from which egress originates.

[BE] 1026.5 Standpipes. Standpipes and standpipe hose connections shall be provided where required by Sections 905.3 and 905.4.

1026.6 Two-way communication. *Where a refuge area does not contain a two-way communication system at an elevator landing or within an area of refuge, a two-way communications system shall be installed in an approved location in a public area and shall comply with Sections 1009.8.1, 1009.8.2 and 1009.11.*

Exception: *Two-way communication systems are not required in Group I-2 and I-3 facilities.*

SECTION 1027—EXTERIOR EXIT STAIRWAYS AND RAMPS

[BE] 1027.1 General. Exterior exit stairways and ramps serving as an exit component in a means of egress system shall comply with the requirements of this section.

[BE] 1027.2 Use in a means of egress. Exterior exit stairways shall not be used as an element of a required means of egress for Group I-2 occupancies. For occupancies in other than Group I-2, exterior exit stairways and ramps shall not be used as an element of a required means of egress for buildings exceeding six stories above grade plane or that are high-rise buildings.

[BE] 1027.3 Open side. Exterior exit stairways and ramps serving as an element of a required means of egress shall be open on not less than one side, except for required structural columns, beams, handrails and guards. An open side shall have not less than 35 square feet (3.3 m^2) of aggregate open area adjacent to each floor level and the level of each intermediate landing. The required open area shall be located not less than 42 inches (1067 mm) above the adjacent floor or landing level.

[BE] 1027.4 Side yards. The open areas adjoining exterior exit stairways or ramps shall be either yards, courts or public ways; the remaining sides are permitted to be enclosed by the exterior walls of the building.

[BE] 1027.5 Location. Exterior exit stairways and ramps shall have a minimum fire separation distance of 10 feet (3048 mm) measured at right angles from the exterior edge of the stairway or ramps, including landings, to:

1. Adjacent lot lines.
2. Other portions of the building.
3. Other buildings on the same lot unless the adjacent building exterior walls and openings are protected in accordance with Section 705 of the *California Building Code* based on fire separation distance.

For the purposes of this section, other portions of the building shall be treated as separate buildings.

Exception: Exterior exit stairways and ramps serving individual dwelling units of Group R-3 shall have a fire separation distance of not less than 5 feet (1524 mm).

[BE] 1027.6 Exterior exit stairway and ramp protection. Exterior exit stairways and ramps shall be separated from the interior of the building as required in Section 1023.2. Openings shall be limited to those necessary for egress from normally occupied spaces. Where a vertical plane projecting from the edge of an exterior exit stairway or ramp and landings is exposed by other parts of the building at an angle of less than 180 degrees (3.14 rad), the exterior wall shall be rated in accordance with Section 1023.7.

Exceptions:

1. Separation from the interior of the building is not required for occupancies, other than those in Group R-1 or R-2, in buildings that are not more than two stories above grade plane where a level of exit discharge serving such occupancies is the first story above grade plane.
2. Separation from the interior of the building is not required where the exterior exit stairway or ramp is served by an exterior exit ramp or balcony that connects two remote exterior exit stairways or other approved exits, with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the openings not less than 7 feet (2134 mm) above the top of the balcony.

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3. Separation from the open-ended corridor of the building is not required for exterior exit stairways or ramps, provided that Items 3.1 through 3.5 are met:
    3.1. The building, including open-ended corridors, and stairways and ramps, shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.
    3.2. The open-ended corridors comply with Section 1020.
    3.3. The open-ended corridors are connected on each end to an exterior exit stairway or ramp complying with Section 1027.
    3.4. The exterior walls and openings adjacent to the exterior exit stairway or ramp comply with Section 1023.7.
    3.5. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3.3 m^2) or an exterior stairway or ramp shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.
4. In Group R-3 occupancies not more than four stories in height, exterior exit stairways and ramps serving individual dwelling units are not required to be separated from the interior of the building where the exterior exit stairway or ramp discharges directly to grade.

SECTION 1028—EXIT DISCHARGE

[BE] 1028.1 General. The exit discharge shall comply with Sections 1028 and 1029 and the applicable requirements of Sections 1003 through 1015.

[BE] 1028.2 Exit discharge. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide a direct path of egress travel to grade. The exit discharge shall not reenter a building. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and minimum width or required capacity of the required exits.

Exceptions:

1. Not more than 50 percent of the number and minimum width or required capacity of interior exit stairways and ramps is permitted to egress through areas, including atriums, on the level of discharge provided that all of the following conditions are met:
    1.1. Discharge of interior exit stairways and ramps shall be provided with a free and unobstructed path of travel to an exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
    1.2. The entire area of the level of exit discharge is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
    1.3. The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system. Portions of the level of exit discharge with access to the egress path shall either be equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, or separated from the egress path in accordance with the requirements for the enclosure of interior exit stairways or ramps.
    1.4. Where a required interior exit stairway or ramp and an exit access stairway or ramp serve the same floor level and terminate at the same level of exit discharge, the termination of the exit access stairway or ramp and the exit discharge door of the interior exit stairway or ramp shall be separated by a distance of not less than 30 feet (9144 mm) or not less than one-fourth the length of the maximum overall diagonal dimension of the building, whichever is less. The distance shall be measured in a straight line between the exit discharge door from the interior exit stairway or ramp and the last tread of the exit access stairway or termination of slope of the exit access ramp.
2. Not more than 50 percent of the number and minimum width or required capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided that all of the following conditions are met:
    2.1. The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating of the interior exit stairway or ramp enclosure.
    2.2. The depth from the exterior of the building is not greater than 10 feet (3048 mm) and the length is not greater than 30 feet (9144 mm).
    2.3. The area is separated from the remainder of the level of exit discharge by a fire partition constructed in accordance with Section 708 of the *California Building Code*.

        Exception: The maximum transmitted temperature rise is not required.
    2.4. The area is used only for means of egress and exits directly to the outside.
3. Horizontal exits complying with Section 1026 shall not be required to discharge directly to the exterior of the building.

[BE] 1028.3 Exit discharge width or capacity. The minimum width or required capacity of the exit discharge shall be not less than the minimum width or required capacity of the exits being served.

[BE] 1028.4 Exit discharge components. Exit discharge components shall be sufficiently open to the exterior so as to minimize the accumulation of smoke and toxic gases.

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[BE] 1028.5 Access to a public way. The exit discharge shall provide a direct and unobstructed access to a public way.

Exception: Where access to a public way cannot be provided, a safe dispersal area shall be provided where all of the following are met:

1. The area shall be of a size to accommodate not less than 5 square feet (0.46 m^2) for each person.
2. *For other than Group E buildings t*he area shall be located on the same lot not less than 50 feet (15 240 mm) away from the building requiring egress. *For Group E buildings, the area shall be located on the same lot at least 50 feet (15 240 mm) away from any building.*
3. The area shall be permanently maintained and identified as a safe dispersal area.
4. The area shall be provided with a safe and unobstructed path of travel from the building.

SECTION 1029—EGRESS COURTS

[BE] 1029.1 General. Egress courts serving as an exit discharge component in the means of egress system shall comply with the requirements in this section.

[BE] 1029.2 Width or capacity. The required capacity of egress courts shall be determined as specified in Section 1005.1, but the minimum width shall be not less than 44 inches (1118 mm), except as specified herein. Egress courts serving Group R-3 and U occupancies shall be not less than 36 inches (914 mm) in width. The required capacity and width of egress courts shall be unobstructed to a height of 7 feet (2134 mm).

The width of the egress court shall be not less than the required capacity.

Exception: Encroachments complying with Section 1005.7.

[BE] 1029.3 Construction and openings. Where an egress court serving a building or portion thereof is less than 10 feet (3048 mm) in width, the egress court walls shall have not less than 1-hour fire-resistance-rated construction for a distance of 10 feet (3048 mm) above the floor of the egress court. Openings within such walls shall be protected by opening protectives having a fire protection rating of not less than $^3/_4$ hour.

Exceptions:

1. Egress courts serving an occupant load of less than 10.
2. Egress courts serving Group R-3.
3. Egress courts, located at grade, that provide direct and unobstructed access to a public way through two or more independent paths. The minimum width provided along each path shall be based on the required width or the required capacity, whichever is greater, and shall be maintained along each path.

SECTION 1030—ASSEMBLY

[BE] 1030.1 General. A room or space used for assembly purposes that contains seats, tables, displays, equipment or other material shall comply with this section.

Exception: *Group A occupancies within Group I-3 facilities are exempt from egress requirements of Section 1029.*

[BE] 1030.1.1 Bleachers. Bleachers, grandstands and folding and telescopic seating, that are not building elements, shall comply with ICC 300.

[BE] 1030.1.1.1 Spaces under grandstands and bleachers. Spaces under grandstands or bleachers shall be separated by fire barriers complying with Section 707 of the *California Building Code* and horizontal assemblies complying with Section 711 of the *California Building Code* with not less than 1-hour fire-resistance-rated construction.

Exceptions:

1. Ticket booths less than 100 square feet (9 m^2) in area.
2. Toilet rooms.
3. Other accessory use areas 1,000 square feet (93 m^2) or less in area and equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

[BE] 1030.2 Assembly main exit. A building, room or space used for assembly purposes that has an occupant load of greater than 300 and is provided with a main exit, that main exit shall be of sufficient capacity to accommodate not less than one-half of the occupant load, but such capacity shall be not less than the total required capacity of all means of egress leading to the exit. Where the building is classified as a Group A occupancy, the main exit shall front on not less than one street or an unoccupied space of not less than *20 feet (6096 mm)* in width that adjoins a street or public way. In a building, room or space used for assembly purposes where there is not a well-defined main exit or where multiple main exits are provided, exits shall be permitted to be distributed around the perimeter of the building provided that the total capacity of egress is not less than 100 percent of the required capacity *and not less than one exit shall discharge on a street or an unoccupied space of not less than 20 feet (6096 mm) in capacity that adjoins a street or publicway. Smoke-protected seating shall comply with Section 1030.6.2.*

[BE] 1030.3 Assembly other exits. In addition to having access to a main exit, each level in a building used for assembly purposes having an occupant load greater than 300 and provided with a main exit, shall be provided with additional means of egress that shall provide an egress capacity for not less than one-half of the total occupant load served by that level and shall

comply with Section 1007.1. *Not less than one-half of the additional means of egress required by this section shall be directly to an exit, or through a lobby, that is not used to access the main exit, to an exit, or to a 1-hour rated corridor to an exit.* In a building used for assembly purposes where there is not a well-defined main exit or where multiple main exits are provided, exits for each level shall be permitted to be distributed around the perimeter of the building, provided that the total width of egress is not less than 100 percent of the required width *and not less than one exit shall discharge on a street or an unoccupied space of not less than 20 feet (6096 mm) in capacity that adjoins a street or publicway. Smoke-protected seating shall comply with Section 1030.6.2.*

1030.3.1 Occupant loads 300 or less. *Group A occupancies or assembly occupancies accessory to Group E occupancies that have an occupant load of 100 or more and 300 or less, shall have not less than one of the required means of egress directly to an exit, or through a lobby, that is not used to access the other required exit, to an exit, or to a 1-hour rated corridor to an exit or continuous through a 1-hour rated lobby to an exit. Not less than one exit shall discharge on a street or an unoccupied space of not less than 20 feet (6096 mm) in capacity that adjoins a street or public way.*

[BE] 1030.4 Foyers and lobbies. In Group A-1 occupancies, where persons are admitted to the building at times when seats are not available, such persons shall be allowed to wait in a lobby or similar space, provided that such lobby or similar space shall not encroach on the minimum width or required capacity of the means of egress. Such foyer, if not directly connected to a public street by all the main entrances or exits, shall have a straight and unobstructed corridor or path of travel to every such main entrance or exit.

[BE] 1030.5 Interior balcony and gallery means of egress. For balconies, galleries or press boxes having a seating capacity of 50 or more located in a building, room or space used for assembly purposes, not less than two means of egress shall be provided, with one from each side of every balcony, gallery or press box.

[BE] 1030.6 Capacity of aisle for assembly. The required capacity of aisles shall be not less than that determined in accordance with Section 1030.6.1 where smoke-protected assembly seating is not provided, with Section 1030.6.2 where smoke-protected assembly seating is provided, and with Section 1030.6.3 where open-air assembly seating is provided.

[BE] 1030.6.1 Without smoke protection. The required capacity in inches (mm) of the aisles for assembly seating without smoke protection shall be not less than the occupant load served by the egress element in accordance with all of the following, as applicable:

1. Not less than 0.3 inch (7.6 mm) of aisle capacity for each occupant served shall be provided on stepped aisles having riser heights 7 inches (178 mm) or less and tread depths 11 inches (279 mm) or greater, measured horizontally between tread nosings.
2. Not less than 0.005 inch (0.127 mm) of additional aisle capacity for each occupant shall be provided for each 0.10 inch (2.5mm) of riser height above 7 inches (178 mm).
3. Where egress requires stepped aisle descent, not less than 0.075 inch (1.9 mm) of additional aisle capacity for each occupant shall be provided on those portions of aisle capacity that do not have a handrail within a horizontal distance of 30 inches (762 mm).
4. Ramped aisles, where slopes are steeper than 1 unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.22 inch (5.6 mm) of clear aisle capacity for each occupant served. Level or ramped aisles, where slopes are not steeper than 1 unit vertical in 12 units horizontal (8-percent slope), shall have not less than 0.20 inch (5.1 mm) of clear aisle capacity for each occupant served.

[BE] 1030.6.2 Smoke-protected assembly seating. The required capacity in inches (mm) of the aisle for smoke-protected assembly seating shall be not less than the occupant load served by the egress element multiplied by the appropriate factor in Table 1030.6.2. The total number of seats specified shall be those within the space exposed to the same smoke-protected environment. Interpolation is permitted between the specific values shown. A life safety evaluation, complying with NFPA 101, shall be done for a facility utilizing the reduced width requirements of Table 1030.6.2 for smoke-protected assembly seating.

[BE] TABLE 1030.6.2—CAPACITY FOR AISLES FOR SMOKE-PROTECTED ASSEMBLY

TOTAL NUMBER OF SEATS IN THE SMOKE-PROTECTED ASSEMBLY SEATING	INCHES OF CAPACITY PER SEAT SERVED			
	Stepped aisles with handrails within 30 inches	Stepped aisles without handrails within 30 inches	Level aisles or ramped aisles not steeper than 1 in 10 in slope	Ramped aisles steeper than 1 in 10 in slope
Equal to or less than 5,000	0.200	0.250	0.150	0.165
10,000	0.130	0.163	0.100	0.110
15,000	0.096	0.120	0.070	0.077
20,000	0.076	0.095	0.056	0.062
Equal to or greater than 25,000	0.060	0.075	0.044	0.048

For SI: 1 inch = 25.4 mm.

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[BE] 1030.6.2.1 Smoke control. Aisles and aisle accessways serving a smoke-protected assembly seating area shall be provided with a smoke control system complying with Section 909 or natural ventilation designed to maintain the smoke level not less than 6 feet (1829 mm) above the floor of the means of egress.

[BE] 1030.6.2.2 Roof height. A smoke-protected assembly seating area with a roof shall have the lowest portion of the roof deck not less than 15 feet (4572 mm) above the highest aisle or aisle accessway.

Exception: A roof canopy in an outdoor stadium shall be permitted to be less than 15 feet (4572 mm) above the highest aisle or aisle accessway provided that there are no objects less than 80 inches (2032 mm) above the highest aisle or aisle accessway.

[BE] 1030.6.2.3 Automatic sprinklers. Enclosed areas with walls and ceilings in buildings or structures containing smoke-protected assembly seating shall be protected with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Exceptions:

1. The floor area used for contests, performances or entertainment provided that the roof construction is more than 50 feet (15 240 mm) above the floor level and the use is restricted to low fire hazard uses.
2. Press boxes and storage facilities less than 1,000 square feet (93 m^2) in area.

[BE] 1030.6.3 Open-air assembly seating. In open-air assembly seating, the required capacity in inches (mm) of aisles shall be not less than the total occupant load served by the egress element multiplied by 0.08 (2.0 mm) where egress is by stepped aisle and multiplied by 0.06 (1.52 mm) where egress is by level aisles and ramped aisles.

Exception: The required capacity in inches (mm) of aisles shall be permitted to comply with Section 1030.6.2 for the number of seats in the open-air assembly seating where Section 1030.6.2 permits less capacity.

[BE] 1030.6.3.1 Automatic sprinklers. Enclosed areas with walls and ceilings in buildings or structures containing open-air assembly seating shall be protected with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Exceptions:

1. The floor area used for contests, performances or entertainment, provided that the roof construction is more than 50 feet (15 240 mm) above the floor level and the use is restricted to low-fire hazard uses.
2. Press boxes and storage facilities less than 1,000 square feet (93 m^2) in area.
3. Open-air assembly seating facilities where seating and the means of egress in the seating area are essentially open to the outside.

1030.6.3.2 Public address system. *See Section 907.2.1.1.*

[BE] 1030.7 Travel distance. The exit access travel distance shall comply with Section 1017. Where aisles are provided for seating, the distance shall be measured along the aisles and aisle accessways without travel over or on the seats.

Exceptions:

1. In facilities with smoke-protected assembly seating the total exit access travel distance shall be not greater than 400 feet (122 m). That portion of the total permitted exit access travel distance from each seat to the nearest entrance to a vomitory or concourse shall not exceed 200 feet (60 960 mm). The portion of the total permitted exit access travel distance from the entrance to the vomitory or concourse to one of the following shall not exceed 200 feet (60 960 mm).
   1.1. The closest riser of an exit access stairway.
   1.2. The closest slope of an exit access ramp.
   1.3. An exit.
2. In facilities with open-air assembly seating of Type III, IV or V construction, the total exit access travel distance to one of the following shall not exceed 400 feet (122 m).
   2.1. The closest riser of an exit access stairway.
   2.2. The closest slope of an exit access ramp.
   2.3. An exit.
3. In facilities with open-air assembly seating of Type I or II construction, the exit access travel distance shall not be limited.

[BE] 1030.8 Common path of egress travel. The common path of egress travel for a room or space used for assembly purposes having fixed seating shall not exceed 30 feet (9144 mm) from any seat to a point where an occupant has a choice of two paths of egress travel to two exits.

Exceptions:

1. For areas serving less than 50 occupants, the common path of egress travel shall not exceed 75 feet (22 860 mm).
2. For smoke-protected or open-air assembly seating, the common path of egress travel shall not exceed 50 feet (15 240 mm).

[BE] 1030.8.1 Path through adjacent row. Where one of the two paths of travel is across the aisle through a row of seats to another aisle, there shall be not more than 24 seats between the two aisles, and the minimum clear width between rows for the row between the two aisles shall be 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row between aisles.

Exception: For smoke-protected or open-air assembly seating there shall be not more than 40 seats between the two aisles and the minimum clear width shall be 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat.

[BE] 1030.9 Assembly aisles are required. Every occupied portion of any building, room or space used for assembly purposes that contains seats, tables, displays, similar fixtures or equipment shall be provided with aisles leading to exits or exit access doorways in accordance with this section.

[BE] 1030.9.1 Minimum aisle width. The minimum clear width for aisles shall comply with one of the following:

1. Forty-eight inches (1219 mm) for stepped aisles having seating on both sides.

   Exception: Thirty-six inches (914 mm) where the stepped aisles serve less than 50 seats.
2. Thirty-six inches (914 mm) for stepped aisles having seating on only one side.

   Exception: Twenty-three inches (584 mm) between a stepped aisle handrail and seating where a stepped aisle does not serve more than five rows on one side.
3. Twenty-three inches (584 mm) between a stepped aisle handrail or guard and seating where the stepped aisle is subdivided by a mid-aisle handrail.
4. Forty-two inches (1067 mm) for level or ramped aisles having seating on both sides.

   Exceptions:

   1. Thirty-six inches (914 mm) where the aisle serves less than 50 seats.
   2. Thirty inches (762 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.
5. Thirty-six inches (914 mm) for level or ramped aisles having seating on only one side.

   Exception: Thirty inches (762 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.
6. *Libraries with open book stacks shall have main aisles not less than 44 inches (1118 mm) in width, and side, range and end aisles not less than 36 inches (914 mm) in width.*

[BE] 1030.9.2 Aisle catchment area. The aisle shall provide sufficient capacity for the number of persons accommodated by the catchment area served by the aisle. The catchment area served by an aisle is that portion of the total space served by that section of the aisle. In establishing catchment areas, the assumption shall be made that there is a balanced use of all means of egress, with the number of persons in proportion to egress capacity.

[BE] 1030.9.3 Converging aisles. Where aisles converge to form a single path of egress travel, the required capacity of that path shall be not less than the combined required capacity of the converging aisles.

[BE] 1030.9.4 Uniform width and capacity. Those portions of aisles, where egress is possible in either of two directions, shall be uniform in minimum width or required capacity.

[BE] 1030.9.5 Dead-end aisles. Each end of an aisle shall be continuous to a cross aisle, foyer, doorway, vomitory, concourse or stairway in accordance with Section 1030.9.7 having access to an exit.

Exceptions:

1. Dead-end aisles not greater than 20 feet (6096 mm) in length.
2. Dead-end aisles longer than 20 feet (6096 mm) are permitted where seats beyond the 20-foot (6096 mm) dead-end aisle are not more than 24 seats from another aisle, measured along a row of seats having a minimum clear width of 12 inches (305 mm) plus 0.6 inch (15.2 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.
3. Dead-end aisles serving fewer than 50 seats and complying with Section 1030.8.
4. For smoke-protected or open-air assembly seating, dead-end vertical aisles of 21 rows or fewer.
5. For smoke-protected or open-air assembly seating, dead-end aisles beyond the 21-row dead-end aisle where such rows are not more than 40 seats from another aisle, measured along a row of seats having an aisle accessway with a minimum clear width of 12 inches (305 mm) plus 0.3 inch (7.6 mm) for each additional seat above seven in the row where seats have backrests or beyond 10 where seats are without backrests in the row.

[BE] 1030.9.6 Aisle measurement. The clear width for *aisles* shall be measured to walls, edges of seating and tread edges except for permitted projections.

Exception: The clear width of aisles adjacent to seating at tables shall be permitted to be measured in accordance with Section 1030.13.1.

[BE] 1030.9.6.1 Assembly aisle obstructions. There shall not be obstructions in the minimum width or required capacity of *aisles*.

Exception: Handrails are permitted to project into the required width of stepped aisles and ramped aisles in accordance with Section 1014.9.

[BE] 1030.9.7 Stairways connecting to stepped aisles. A stairway that connects a stepped aisle to a cross aisle or concourse shall be permitted to comply with the assembly aisle walking surface requirements of Section 1030.14. Transitions between stairways and stepped aisles shall comply with Section 1030.10.

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[BE] 1030.9.8 Stairways connecting to vomitories. A stairway that connects a vomitory to a cross aisle or concourse shall be permitted to comply with the assembly aisle walking surface requirements of Section 1030.14. Transitions between stairways and stepped aisles shall comply with Section 1030.10.

[BE] 1030.10 Transitions. Transitions between stairways and stepped aisles shall comply with either Section 1030.10.1 or 1030.10.2.

[BE] 1030.10.1 Transitions to stairways that maintain stepped aisle riser and tread dimensions. Stepped aisles, transitions and stairways that maintain the stepped aisle riser and tread dimensions shall comply with Section 1030.14 as one exit access component.

[BE] 1030.10.2 Transitions to stairways that do not maintain stepped aisle riser and tread dimensions. Transitions between stairways and stepped aisles having different riser and tread dimensions shall comply with Sections 1030.10.2.1 through 1030.10.3.

[BE] 1030.10.2.1 Stairways and stepped aisles in a straight run. Where stairways and stepped aisles are in a straight run, transitions shall have one of the following:

1. A depth of not less than 22 inches (559 mm) where the treads on the descending side of the transition have greater depth.
2. A depth of not less than 30 inches (762 mm) where the treads on the descending side of the transition have lesser depth.

[BE] 1030.10.2.2 Stairways that change direction from stepped aisles. Transitions where the stairway changes direction from the stepped aisle shall have a minimum depth of 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater, between the stepped aisle and stairway.

[BE] 1030.10.3 Transition marking. A distinctive marking stripe shall be provided at each nosing or leading edge adjacent to the transition. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide. The edge marking stripe shall be distinctively different from the stepped aisle contrasting marking stripe.

[BE] 1030.11 Stepped aisles at vomitories. Stepped aisles that change direction at vomitories shall comply with Section 1030.11.1. Transitions between a stepped aisle above a vomitory and a stepped aisle to the side of a vomitory shall comply with Section 1030.11.2.

[BE] 1030.11.1 Stepped aisles that change direction at vomitories. Stepped aisle treads where the stepped aisle changes direction at a vomitory shall have a depth of not less than 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater. The height of a stepped aisle tread above a transition at a vomitory shall comply with Section 1030.14.2.2.

[BE] 1030.11.2 Stepped aisle transitions at the top of vomitories. Transitions between the stepped aisle above a vomitory and stepped aisles to the side of a vomitory shall have a depth of not less than 11 inches (280 mm) or the stepped aisle tread depth, whichever is greater.

[BE] 1030.12 Construction. Aisles, stepped aisles and ramped aisles shall be built of materials consistent with the types permitted for the type of construction of the building.

Exception: Wood handrails shall be permitted for all types of construction.

[BE] 1030.12.1 Walking surface. The surface of aisles, stepped aisles and ramped aisles shall be of slip-resistant materials that are securely attached. The surface for stepped aisles shall comply with Section 1011.7.1.

[BE] 1030.12.2 Outdoor conditions. Outdoor aisles, stepped aisles and ramped aisles and outdoor approaches to aisles, stepped aisles and ramped aisles shall be designed so that water will not accumulate on the walking surface.

[BE] 1030.13 Aisle accessways. Aisle accessways for seating at tables shall comply with Section 1030.13.1. Aisle accessways for seating in rows shall comply with Section 1030.13.2.

[BE] 1030.13.1 Seating at tables. Where seating is located at a table or counter and is adjacent to an aisle or aisle accessway, the measurement of required clear width of the aisle or aisle accessway shall be made to a line 19 inches (483 mm) away from and parallel to the edge of the table or counter. The 19-inch (483 mm) distance shall be measured perpendicular to the side of the table or counter. In the case of other side boundaries for aisles or aisle accessways, the clear width shall be measured to walls, edges of seating and tread edges.

Exception: Where tables or counters are served by fixed seats, the width of the aisle or aisle accessway shall be measured from the back of the seat.

[BE] 1030.13.1.1 Aisle accessway capacity and width for seating at tables. Aisle accessways serving arrangements of seating at tables or counters shall comply with the capacity requirements of Section 1005.1 but shall not have less than 12 inches (305 mm) of width plus $^1/_2$ inch (12.7 mm) of width for each additional 1 foot (305 mm), or fraction thereof, beyond 12 feet (3658 mm) of aisle accessway length measured from the center of the seat farthest from an aisle.

Exception: Portions of an aisle accessway having a length not exceeding 6 feet (1829 mm) and used by a total of not more than four persons.

[BE] 1030.13.1.2 Seating at table aisle accessway length. The length of travel along the aisle accessway shall not exceed 30 feet (9144 mm) from any seat to the point where a person has a choice of two or more paths of egress travel to separate exits.

[BE] 1030.13.2 Clear width of aisle accessways serving seating in rows. Where seating rows have 14 or fewer seats, the minimum clear aisle accessway width shall be not less than 12 inches (305 mm) measured as the clear horizontal distance from the

back of the row ahead and the nearest projection of the row behind. Where chairs have automatic or self-rising seats, the measurement shall be made with seats in the raised position. Where any chair in the row does not have an automatic or self-rising seat, the measurements shall be made with the seat in the down position. For seats with folding tablet arms, row spacing shall be determined with the tablet arm in the used position.

Exception: For seats with folding tablet arms, row spacing is permitted to be determined with the tablet arm in the stored position where the tablet arm when raised manually to vertical position in one motion automatically returns to the stored position by force of gravity.

[BE] 1030.13.2.1 Dual access. For rows of seating served by aisles or doorways at both ends, there shall be not more than 100 seats per row. The minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.3 inch (7.6 mm) for every additional seat beyond 14 seats where seats have backrests or beyond 21 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

Exception: For smoke-protected or open-air assembly seating, the row length limits for a 12-inch-wide (305 mm) aisle accessway, beyond which the aisle accessway minimum clear width shall be increased, are in Table 1030.13.2.1.

[BE] TABLE 1030.13.2.1—SMOKE-PROTECTED OR OPEN-AIR ASSEMBLY AISLE ACCESSWAYS

NUMBER OF SEATS IN THE SMOKE-PROTECTED OR OPEN-AIR ASSEMBLY SEATING	MAXIMUM NUMBER OF SEATS PER ROW PERMITTED TO HAVE A MINIMUM 12-INCH CLEAR WIDTH AISLE ACCESSWAY			
	Aisle or doorway at both ends of row		Aisle or doorway at one end of row only	
	Seats with backrests	Seats without backrests	Seats with backrests	Seats without backrests
Less than 4,000	14	21	7	10
4,000 to 6,999	15	22	7	10
7,000 to 9,999	16	23	8	11
10,000 to 12,999	17	24	8	11
13,000 to 15,999	18	25	9	12
16,000 to 18,999	19	26	9	12
19,000 to 21,999	20	27	10	13
22,000 and greater	21	28	11	14

For SI: 1 inch = 25.4 mm.

[BE] 1030.13.2.2 Single access. For rows of seating served by an aisle or doorway at only one end of the row, the minimum clear width of 12 inches (305 mm) between rows shall be increased by 0.6 inch (15.2 mm) for every additional seat beyond seven seats where seats have backrests or beyond 10 where seats are without backrests. The minimum clear width is not required to exceed 22 inches (559 mm).

Exception: For smoke-protected or open-air assembly seating, the row length limits for a 12-inch-wide (305 mm) aisle accessway, beyond which the aisle accessway minimum clear width shall be increased, are in Table 1030.13.2.1.

[BE] 1030.14 Assembly aisle walking surfaces. Ramped aisles shall comply with Sections 1030.14.1 through 1030.14.1.3. Stepped aisles shall comply with Sections 1030.14.2 through 1030.14.2.4.

[BE] 1030.14.1 Ramped aisles. Aisles that are sloped more than 1 unit vertical in 20 units horizontal (5-percent slope) shall be considered to be a ramped aisle. Ramped aisles that serve as part of an accessible route in accordance with Section 1009 of this code and Section 1108.2 of the *California Building Code* shall have a maximum slope of 1 unit vertical in 12 units horizontal (8-percent slope). The slope of other ramped aisles shall not exceed 1 unit vertical in 8 units horizontal (12.5-percent slope).

[BE] 1030.14.1.1 Cross slope. The slope measured perpendicular to the direction of travel of a ramped aisle shall not be steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

[BE] 1030.14.1.2 Landings. Ramped aisles shall have landings in accordance with Sections 1012.6 through 1012.6.5. Landings for ramped aisles shall be permitted to overlap required aisles or cross aisles.

[BE] 1030.14.1.3 Edge protection. Ramped aisles shall have edge protection in accordance with Sections 1012.10 and 1012.10.1.

Exception: In assembly spaces with fixed seating, edge protection is not required on the sides of ramped aisles where the ramped aisles provide access to the adjacent seating and aisle accessways.

[BE] 1030.14.2 Stepped aisles. Aisles with a slope exceeding 1 unit vertical in 8 units horizontal (12.5-percent slope) shall consist of a series of risers and treads that extends across the full width of aisles and complies with Sections 1030.14.2.1 through 1030.14.2.4.

[BE] 1030.14.2.1 Treads. Tread depths shall be not less than 11 inches (279 mm) and shall have dimensional uniformity.

Exception: The tolerance between adjacent treads shall not exceed $^{3}/_{16}$ inch (4.8 mm).

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[BE] 1030.14.2.2 Risers. Where the gradient of stepped aisles is to be the same as the gradient of adjoining seating areas, the riser height shall be not less than 4 inches (102 mm) nor more than 8 inches (203 mm) and shall be uniform within each flight.

Exceptions:

1. Riser height nonuniformity shall be limited to the extent necessitated by changes in the gradient of the adjoining seating area to maintain adequate sightlines. Where nonuniformities exceed $^{3}/_{16}$ inch (4.8 mm) between adjacent risers, the exact location of such nonuniformities shall be indicated with a distinctive marking stripe on each tread at the nosing or leading edge adjacent to the nonuniform risers. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide. The edge marking stripe shall be distinctively different from the contrasting marking stripe.
2. Riser heights not exceeding 9 inches (229 mm) shall be permitted where they are necessitated by the slope of the adjacent seating areas to maintain sightlines.

[BE] 1030.14.2.2.1 Construction tolerances. The tolerance between adjacent risers on a stepped aisle that were designed to be equal height shall not exceed $^{3}/_{16}$ inch (4.8 mm). Where the stepped aisle is designed in accordance with Exception 1 of Section 1030.14.2.2, the stepped aisle shall be constructed so that each riser of unequal height, determined in the direction of descent, is not more than $^{3}/_{8}$ inch (9.5 mm) in height different from adjacent risers where stepped aisle treads are less than 22 inches (560 mm) in depth and $^{3}/_{4}$ inch (19.1 mm) in height different from adjacent risers where stepped aisle treads are 22 inches (560 mm) or greater in depth.

[BE] 1030.14.2.3 Tread contrasting marking stripe. A contrasting marking stripe shall be provided on each tread at the nosing or leading edge such that the location of each tread is readily apparent when viewed in descent. Such stripe shall be not less than 1 inch (25 mm), and not more than 2 inches (51 mm), wide.

Exception: The contrasting marking stripe is permitted to be omitted where tread surfaces are such that the location of each tread is readily apparent when viewed in descent.

[BE] 1030.14.2.4 Nosing and profile. Nosing and riser profile shall comply with Sections 1011.5.5 through 1011.5.5.3.

[BE] 1030.15 Seat stability. In a building, room or space used for assembly purposes, the seats shall be securely fastened to the floor.

Exceptions:

1. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with 200 or fewer seats, the seats shall not be required to be fastened to the floor.
2. In a building, room or space used for assembly purposes or portions thereof with seating at tables and without ramped or tiered floors for seating, the seats shall not be required to be fastened to the floor.
3. In a building, room or space used for assembly purposes or portions thereof without ramped or tiered floors for seating and with greater than 200 seats, the seats shall be fastened together in groups of not less than three or the seats shall be securely fastened to the floor.
4. In a building, room or space used for assembly purposes where flexibility of the seating arrangement is an integral part of the design and function of the space and seating is on tiered levels, not more than 200 seats shall not be required to be fastened to the floor. Plans showing seating, tiers and aisles shall be submitted for approval.
5. Groups of seats within a building, room or space used for assembly purposes separated from other seating by railings, guards, partial height walls or similar barriers with level floors and having not more than 14 seats per group shall not be required to be fastened to the floor.
6. Seats intended for musicians or other performers and separated by railings, guards, partial height walls or similar barriers shall not be required to be fastened to the floor.

[California Code of Regulations, Title 19, Division 1, §3.06(a)] Bonding of Chairs and Spacing of Tables.

(a) Bonding of chairs. In every Group A and Group E occupancy, all loose seats, folding chairs or similar seating facilities that are not fixed to the floor shall be bonded together in groups of not less than three.

Exceptions:

(1) When not more than 200 such seats, chairs or facilities are provided, bonding thereof may be deleted.

(2) The bonding of chairs shall not be required when tables are provided as when the occupancy is used for dining or similar purposes.

(3) Upon approval of the enforcing agency, the bonding of chairs shall not be required when the placement and location of such chairs do not obstruct any required exit or any line of egress toward required exits and do not constitute a fire hazard as defined in California Code of Regulations, Title 19, Division 1, Section 3.14.

[BE] 1030.16 Handrails. Ramped aisles having a slope exceeding 1 unit vertical in 15 units horizontal (6.7-percent slope) and stepped aisles shall be provided with handrails in compliance with Section 1014 located either at one or both sides of the aisle or within the aisle width. Where stepped aisles have seating on one side and the aisle width is 74 inches (1880 mm) or greater, two handrails are required. Where two handrails are required, one of the handrails shall be within 30 inches (762 mm) horizontally of the side of the tiered floor adjacent to the stepped aisle.

Exceptions:

1. Handrails are not required for ramped aisles with seating on both sides.

2. Handrails are not required where, at the side of the aisle, there is a guard with a top surface that complies with the graspability requirements of handrails in accordance with Section 1014.4.
3. Handrail extensions are not required at the top and bottom of stepped aisles and ramped aisles to permit crossovers within the aisles.

[BE] 1030.16.1 Discontinuous handrails. Where there is seating on both sides of the aisle, the mid-aisle handrails shall be discontinuous. Where a stepped aisle is required to have two handrails, the mid-aisle handrails shall be discontinuous. Gaps or breaks shall be provided at intervals not exceeding five rows to facilitate access to seating and to permit crossing from one side of the aisle to the other. These gaps or breaks shall have a clear width of not less than 22 inches (559 mm) and not greater than 36 inches (914 mm), measured horizontally, and the mid-aisle handrail shall have rounded terminations or bends.

[BE] 1030.16.2 Handrail termination. Handrails located on the side of stepped aisles shall return to a wall, guard or the walking surfaces or shall be continuous to the handrail of an adjacent stepped aisle flight.

[BE] 1030.16.3 Mid-aisle termination. Mid-aisle handrails shall not extend beyond the lowest riser and shall terminate within 18 inches (381 mm), measured horizontally, from the lowest riser. Handrail extensions are not required.

Exception: Mid-aisle handrails shall be permitted to extend beyond the lowest riser where the handrail extensions do not obstruct the width of the cross aisle.

[BE] 1030.16.4 Rails. Where mid-aisle handrails are provided in stepped aisles, there shall be an additional rail located approximately 12 inches (305 mm) below the handrail. The rail shall be adequate in strength and attachment in accordance with Section 1607.9.1.2 of the *California Building Code*.

[BE] 1030.17 Assembly guards. Guards adjacent to seating in a building, room or space used for assembly purposes shall be provided where required by Section 1015 and shall be constructed in accordance with Section 1015 except where provided in accordance with Sections 1030.17.1 through 1030.17.4. At bleachers, grandstands and folding and telescopic seating, guards must be provided where required by ICC 300 and Section 1030.17.1.

[BE] 1030.17.1 Perimeter guards. Perimeter guards shall be provided where the footboards or walking surface of seating facilities are more than 30 inches (762 mm) above the floor or grade below. Where the seatboards are adjacent to the perimeter, guard height shall be 42 inches (1067 mm) high minimum, measured from the seatboard. Where the seats are self-rising, guard height shall be 42 inches (1067 mm) high minimum, measured from the floor surface. Where there is an aisle between the seating and the perimeter, the guard height shall be measured in accordance with Section 1015.3.

Exceptions:

1. Guards that impact sightlines shall be permitted to comply with Section 1030.17.3.
2. Bleachers, grandstands and folding and telescopic seating shall not be required to have perimeter guards where the seating is located adjacent to a wall and the space between the wall and the seating is less than 4 inches (102 mm).

[BE] 1030.17.2 Cross aisles. Cross aisles located more than 30 inches (762 mm) above the floor or grade below shall have guards in accordance with Section 1015.

Where an elevation change of 30 inches (762 mm) or less occurs between a cross aisle and the adjacent floor or grade below, guards not less than 26 inches (660 mm) above the aisle floor shall be provided.

Exception: Where the backs of seats on the front of the cross aisle project 24 inches (610 mm) or more above the adjacent floor of the aisle, a guard need not be provided.

[BE] 1030.17.3 Sightline-constrained guard heights. Unless subject to the requirements of Section 1030.17.4, a fascia or railing system in accordance with the guard requirements of Section 1015 and having a minimum height of 26 inches (660 mm) shall be provided where the floor or footboard elevation is more than 30 inches (762 mm) above the floor or grade below and the fascia or railing would otherwise interfere with the sightlines of immediately adjacent seating.

[BE] 1030.17.4 Guards at the end of aisles. A fascia or railing system complying with the guard requirements of Section 1015 shall be provided for the full width of the aisle where the foot of the aisle is more than 30 inches (762 mm) above the floor or grade below. The fascia or railing shall be not less than 36 inches (914 mm) high and shall provide not less than 42 inches (1067 mm) measured diagonally between the top of the rail and the nosing of the nearest tread.

SECTION 1031—EMERGENCY ESCAPE AND RESCUE

[BE] 1031.1 General. Emergency escape and rescue openings shall comply with the requirements of this section.

[BE] 1031.2 Where required. In addition to the means of egress required by this chapter, emergency escape and rescue openings shall be provided in *Group R* occupancies:

1. Group R-2 occupancies located in stories with only one exit or access to only one exit as permitted by Tables 1006.3.4(1) and 1006.3.4(2).
2. Group R-3 and R-4 occupancies.

Basements and sleeping rooms below the fourth story above grade plane shall have not fewer than one emergency escape and rescue opening in accordance with this section. Where basements contain one or more sleeping rooms, an emergency escape and rescue opening shall be required in each sleeping room, but shall not be required in adjoining areas of the basement. Such open-

ings shall open directly into a public way or to a yard or court that opens to a public way, or to an egress balcony that leads to a public way.

Exceptions:

1. *In Groups R-1 and R-2 occupancies constructed of Type I, Type IIA, Type IIIA or Type IV construction equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.*
2. *Group R-2.1 occupancies meeting the requirements for delayed egress in accordance with Section 1010.2.13 may have operable windows that are breakable in sleeping rooms permanently restricted to a maximum of 4-inch open position.*
3. Basements with a ceiling height of less than 80 inches (2032 mm) shall not be required to have emergency escape and rescue openings.
4. Emergency escape and rescue openings are not required from basements or sleeping rooms that have an exit door or exit access door that opens directly into a public way or to a yard, court or exterior egress balcony that leads to a public way.
5. Basements without habitable spaces and having not more than 200 square feet (18.6 m^2) in floor area shall not be required to have emergency escape and rescue openings.
6. Storm shelters are not required to comply with this section where the shelter is constructed in accordance with ICC 500.
7. Within individual dwelling and sleeping units in Groups R-2 and R-3, where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided that the basement has one of the following:
    - 7.1. One means of egress and one emergency escape and rescue opening.
    - 7.2. Two means of egress.
8. *In Group R-2.2 occupancies a certified fire escape is acceptable as a secondary means of egress of existing buildings for this section of the code.*

[BE] 1031.2.1 Operational constraints and opening control devices. Emergency escape and rescue openings *and any exit doors* shall be *maintained free of any obstructions other than those allowed by this section and shall be* operational from inside the room without the use of keys or tools. Window-opening control devices complying with ASTM F2090 shall be permitted for use on windows serving as a required emergency escape and rescue opening. *The release mechanism shall be maintained operable at all times.*

Such bars, grills, grates or any similar devices shall be equipped with an approved exterior release device for use by the fire department only when required by the authority having jurisdiction.

Where security bars (burglar bars) are installed on emergency egress and rescue windows or doors, on or after July 1, 2000, such devices shall comply with California Building Standards Code, Part 12, Chapter 12-3 and other applicable provisions of Part 2.

Exception: *Group R-1 occupancies provided with a monitored fire sprinkler system in accordance with Section 903.2.8 and designed in accordance with NFPA 13 may have openable windows permanently restricted to a maximum 4-inch (102 mm) open position.*

[California Code of Regulations, Title 19, Division 1, §4.2] Labeling.

Burglar bars shall not be sold in California at wholesale or retail unless warning information as specified in California Code of Regulations, Title 19, Division 1, Section 4.3 is provided either on the packaging or provided inside the packaging along with the burglar bars.

[California Code of Regulations, Title 19, Division 1, §4.3(a) through (c)] Warning Information.

(a) Warning information located on or in burglar bar packaging shall contain the following information:

(1) Warning that the burglar bars are intended to deter or delay intruders, they are not intended to prevent entry.

(2) A reprint of the following requirements from California Building Code, Part 2, Chapter 10:

"Bars, grilles, grates or similar devices may be installed on emergency escape or rescue windows, doors or window wells or any required exit door, provided:

1. *The devices are equipped with approved release mechanisms which are openable from the inside without the use of a key or special knowledge or effort; and*
2. *The building is equipped with smoke alarms installed in accordance with California Building Code, Part 2, Section 907.*

Such bars, grilles, grates or similar devices shall be equipped with an approved release device for use by the fire department only on the exterior side for the purpose of fire department emergency access, when required by the authority having jurisdiction."

(3) A statement regarding the necessity of installing early warning smoke alarms (as required by the California Building Code, Part 2, Section 907) and planning occupant's escape routes and meeting places.

(4) Contact the local building and fire official to determine if a local ordinance requires a building permit prior to installation and if the burglar bars are required to have a release mechanism on the outside for use by the fire department in the event of a fire emergency.

(5) *Written directions and illustrations on the operation of the emergency escape release mechanisms. These directions shall include a warning that the mechanisms be tested on a monthly basis.*

(b) The textual information required by this section shall be printed in a minimum 12-point nondecorative lettering providing a sharp contrast to the background.

(c) Graphical information required by this section shall be of sufficient size to clearly illustrate the intended actions.

[California Code of Regulations, Title 19, Division 1, §4.4] Warning Information Location.

When placed on burglar bar packaging, the information required by California Code of Regulations, Title 19, Division 1, Section 4.3 shall be conspicuously located and shall not be covered or made illegible by product advertising not required by Section 4.3.

[California Code of Regulations, Title 19, Division 1, §4.5(a)] Contractor or Installer Disclosures.

Any contractor or installer of burglar bars shall provide the owner of the residential dwelling the warning information required pursuant to California Code of Regulations, Title 19, Division 1, Section 4.3 prior to installing burglar bars.

[California Code of Regulations, Title 19, Division 1, §4.6(a) and (b)] Prohibited Installations.

No person shall install for profit unopenable burglar bars on a residential dwelling:

(a) Where the California Building Code requires openable burglar bars for emergency escape or rescue, or

(b) On mobile homes, manufactured homes or multi-unit manufactured housing unless at least one window or door to the exterior in each bedroom is openable for emergency escape or rescue.

[BE] 1031.3 Emergency escape and rescue openings. Emergency escape and rescue openings shall comply with Sections 1031.3.1 through 1031.3.3.

[BE] 1031.3.1 Minimum size. Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet (0.53 m^2).

Exception: The minimum net clear opening for grade-floor emergency escape and rescue openings shall be 5 square feet (0.46 m^2).

[BE] 1031.3.2 Minimum dimensions. The minimum net clear opening height dimension shall be 24 inches (610 mm). The minimum net clear opening width dimension shall be 20 inches (508 mm). The net clear opening dimensions shall be the result of normal operation of the opening.

[BE] 1031.3.3 Maximum height from floor. Emergency escape and rescue openings shall have the bottom of the clear opening not greater than 44 inches (1118 mm) measured from the floor.

[BE] 1031.4 Emergency escape and rescue doors. Where a door is provided as the required emergency escape and rescue opening, it shall be a swinging door or a sliding door.

[BE] 1031.5 Area wells. An emergency escape and rescue opening with the bottom of the clear opening below the adjacent grade shall be provided with an area well in accordance with Sections 1031.5.1 through 1031.5.3.

[BE] 1031.5.1 Minimum size. The minimum horizontal area of the area well shall be 9 square feet (0.84 m^2), with a horizontal projection and width of not less than 36 inches (914 mm). The area well shall allow the emergency escape and rescue opening to be fully opened.

Exception: The ladder or steps required by Section 1031.5.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.

[BE] 1031.5.2 Ladders or steps. Area wells with a vertical depth of more than 44 inches (1118 mm) shall be equipped with an approved permanently affixed ladder or steps. The ladder or steps shall not be obstructed by the emergency escape and rescue opening when the window or door is in the open position. Ladders or steps required by this section shall not be required to comply with Section 1011.

[BE] 1031.5.2.1 Ladders. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center (o.c.) vertically for the full height of the area well.

[BE] 1031.5.2.2 Steps. Steps shall have an inside width of not less than 12 inches (305 mm), shall have treads greater than 5 inches (127 mm) in depth and a riser height not greater than 18 inches (457 mm) for the full height of the area well.

[BE] 1031.5.3 Drainage. Area wells shall be designed for proper drainage by connecting to the building's foundation drainage system required by Section 1805 of the *California Building Code*.

Exception: A drainage system for area wells is not required where the foundation is on well-drained soil or sand-gravel mixture soils in accordance with the United Soil Classification System, Group I Soils, in accordance with Section 1803.5.1 of the *California Building Code*.

[BE] 1031.6 Bars, grilles, covers and screens. Where bars, grilles, covers, screens or similar devices are permitted to be placed over emergency escape and rescue openings, or area wells that serve such openings, the minimum net clear opening size shall comply with Sections 1031.3 and 1031.5. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the escape and rescue opening.

SECTION 1032—MAINTENANCE OF THE MEANS OF EGRESS

1032.1 General. The means of egress for buildings or portions thereof shall be maintained in accordance with this section.

[California Code of Regulations, Title 19, Division 1, §3.11(a) through (d)] Exits, Aisles, Ramps, Corridors and Passageways.

(a) No person shall install, place or permit the installation or placement of any bed, chair, equipment, concession, turnstile, ticket office or anything whatsoever, in any manner which would block or obstruct the required width of any exit.

(b) No person shall install, place or permit the installation or placement of any combustible material or equipment in or exposed to any exit.

Exceptions:

(1) Furniture or equipment constructed of wood or other material of similar combustibility may be permitted in an exit or exposed to an exit when approved by the enforcing agency.

(2) When approved by the enforcing agency, combustible materials may be permitted in exit foyers and lobbies.

(c) No person shall install, place or permit the installation or placement of any storage material of any kind in any exit regardless of the required width of such exit.

***Exception:** Personal material located in metal lockers in Group B and E occupancies as defined in California Code of Regulations, Title 24, Part 2.*

(d) Aisles shall not be occupied by any person for whom seating is not available.

1032.2 Reliability. Required exit accesses, exits and exit discharges shall be continuously maintained free from obstructions or impediments to full instant use in the case of fire or other emergency where the building area served by the means of egress is occupied. An exit or exit passageway shall not be used for any purpose that interferes with a means of egress.

1032.2.1 Security devices and egress locks. Security devices affecting means of egress shall be subject to approval of the fire code official. Security devices and locking arrangements in the means of egress that restrict, control, or delay egress shall be installed and maintained as required by this chapter.

1032.2.2 Fire escapes. Security enclosures, fences or screening for fire escape stairways shall be approved by the fire code official and shall be constructed such that they do not impede egress to the public way. Means shall be provided for emergency personnel to access the fire escape stair from the exterior of the enclosure.

1032.2.2.1 Maintenance. Fire escape stairways and balconies shall be kept clear and unobstructed at all times and shall be maintained in good working order.

1032.2.2.2 Examination. Fire escape stairways and balconies shall be examined for structural adequacy and safety by a registered design professional or other person acceptable to the fire code official every 5 years. The examination shall determine whether the fire escape stairways and balconies can support the dead load plus a live load of not less than 100 pounds per square foot (4.78 kN/m^2). An inspection report shall be submitted to the fire code official after such examination.

1032.2.3 Locking arrangements in educational occupancies. In Group E occupancies, Group B educational occupancies and Group I-4 occupancies, egress doors with locking arrangements designed to keep intruders from entering the room shall comply with Section 1010.2.8.

1032.3 Obstructions. A means of egress shall be free from obstructions that would prevent its use, including the accumulation of snow and ice.

1032.3.1 Group I-2. In Group I-2, the required clear width for aisles, corridors and ramps that are part of the required means of egress shall comply with Section 407.4.3 of the *California Building Code* and Section 1020.3. The facility shall have a plan to maintain the required clear width during emergency situations.

Exception: In areas required for bed movement, equipment shall be permitted in the required width where all of the following provisions are met:

1. The equipment is low hazard and wheeled.
2. The equipment does not reduce the effective clear width for the means of egress to less than 5 feet (1525 mm).
3. The equipment is limited to:
   - 3.1. Equipment and carts in use.
   - 3.2. Medical emergency equipment.
   - 3.3. Infection control carts.
   - 3.4. Patient lift and transportation equipment.
4. Medical emergency equipment and patient lift and transportation equipment, when not in use, are required to be located on one side of the corridor.
5. The equipment is limited in number to not more than one per patient sleeping room or patient care room within each smoke compartment.

[BE] 1032.4 Exit signs. Exit signs shall be installed and maintained in accordance with the building code that was in effect at the time of construction and the applicable provisions in Section 1104. Decorations, furnishings, equipment or adjacent signage that impairs the visibility of exit signs, creates confusion or prevents identification of the *exit* shall not be allowed.

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1032.5 Nonexit identification. Where a door is adjacent to, constructed similar to and can be confused with a means of egress door, that door shall be identified with an approved sign that identifies the room name or use of the room.

1032.6 Finishes, furnishings and decorations. Means of egress doors shall be maintained in such a manner as to be distinguishable from the adjacent construction and finishes such that the doors are easily recognizable as doors. Furnishings, decorations or other objects shall not be placed so as to obstruct exits, access thereto, egress therefrom, or visibility thereof. Hangings and draperies shall not be placed over exit doors or otherwise be located to conceal or obstruct an exit. Mirrors shall not be placed on exit doors. Mirrors shall not be placed in or adjacent to any exit in such a manner as to confuse the direction of egress.

1032.7 Emergency escape and rescue openings. Required emergency escape and rescue openings shall be maintained in accordance with the code in effect at the time of construction, and both of the following:

1. Required emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.
2. Bars, grilles, grates or similar devices are permitted to be placed over emergency escape and rescue openings provided that the minimum net clear opening size complies with the code that was in effect at the time of construction and the unit is equipped with smoke alarms installed in accordance with Section 907.2.11. Such devices shall be releasable or removable from the inside without the use of a key, tool or force greater than that which is required for normal operation of the emergency escape and rescue opening.

1032.8 Inspection, testing and maintenance. The inspection, testing and maintenance for two-way communication systems shall be in accordance with this code and NFPA 72, and shall be conducted not less than annually or more frequently where required by the fire code official.

1032.8.1 Records. Records of inspections, testing and maintenance shall be maintained on site in a location approved by the fire code official.

1032.9 Floor identification signs. The floor identification signs required by Sections 1023.9 and 1104.24 shall be maintained in an approved manner.

1032.10 Emergency lighting equipment inspection and testing. Emergency lighting shall be maintained in accordance with Section 110 and shall be inspected and tested in accordance with Sections 1032.10.1 and 1032.10.2.

1032.10.1 Activation test. Emergency lighting equipment shall be tested monthly for a duration of not less than 30 seconds. The test shall be performed manually or by an automated self-testing and self-diagnostic routine. Where testing is performed by self-testing and self-diagnostics, a visual inspection of the emergency lighting equipment shall be conducted monthly to identify any equipment displaying a trouble indicator or that has become damaged or otherwise impaired.

1032.10.2 Power test. Battery-powered emergency lighting equipment shall be tested annually by operating the equipment on battery power for not less than 90 minutes.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 11 – CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below			**X**																				
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
1103.3			X																				
1103.3.1			X																				
1103.3.2			X																				
1103.3.3			X																				
1103.7			X																				
1103.7.3			X																				
1103.7.3.1			X																				
1103.7.8 – 1103.7.8.2			X																				
1103.7.9 – 1103.7.9.10			X																				
1103.8 – *1103.8.5.3*			X																				
1103.9.1			X																				
1105.12			X																				
1105.12.1			X																				
1108			X																				
1113			X																				
1114			X																				
1115			X																				
1116			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

11

CONSTRUCTION REQUIREMENTS FOR EXISTING BUILDINGS

User notes:

About this chapter: Chapter 11 applies to existing buildings constructed prior to the adoption of the code and is intended to ensure a minimum degree of fire and life safety to persons occupying existing buildings by providing for alterations to such buildings that do not comply with the minimum requirements of the *California Building Code*. The provisions address general fire safety features such as requirements for fire alarm systems in some existing buildings and general means of egress, and include a section dedicated to existing Group I-2 occupancies.

SECTION 1101—GENERAL

1101.1 Scope. The provisions of this chapter shall apply to existing buildings constructed prior to the adoption of this code.

1101.2 Intent. The intent of this chapter is to provide a minimum degree of fire and life safety to persons occupying existing buildings by providing minimum construction requirements where such existing buildings do not comply with the minimum requirements of the *California Building Code*.

1101.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6 and the *California Building Code*.

1101.4 Owner notification. When a building is found to be in noncompliance with this chapter, the fire code official shall duly notify the owner of the building. Upon receipt of such notice, the owner shall, subject to the following time limits, take necessary actions to comply with the provisions of this chapter.

1101.4.1 Construction documents. Construction documents necessary to comply with this chapter shall be completed and submitted within a time schedule approved by the fire code official.

1101.4.2 Completion of work. Work necessary to comply with this chapter shall be completed within a time schedule approved by the fire code official.

1101.4.3 Extension of time. The fire code official is authorized to grant necessary extensions of time where it can be shown that the specified time periods are not physically practical or pose an undue hardship. The granting of an extension of time for compliance shall be based on the showing of good cause and subject to the filing of an acceptable systematic plan of correction with the fire code official.

SECTION 1102—DEFINITIONS

1102.1 Definitions. The following terms are defined in Chapter 2:

DUTCH DOOR.

EXISTING.

SECTION 1103—FIRE SAFETY REQUIREMENTS FOR EXISTING BUILDINGS

1103.1 Required construction. Existing buildings shall comply with not less than the minimum provisions specified in Table 1103.1 and as further enumerated in Sections 1103.2 through 1103.10.

The provisions of this chapter shall not be construed to allow the elimination of fire protection systems or a reduction in the level of fire safety provided in buildings constructed in accordance with previously adopted codes.

Exceptions:

1. Where a change in fire-resistance rating has been approved in accordance with Section 501.2 or 802.6 of the *California Existing Building Code*.
2. Group U occupancies.

TABLE 1103.1—OCCUPANCY AND USE REQUIREMENTS[a]

SECTION	USE				OCCUPANCY CLASSIFICATION																
	High-rise	Atrium or covered mall	Under-ground building	Tire storage	A	B	E	F	H-1	H-2	H-3	H-4	H-5	I-2	I-3	I-4	M	R-1	R-2	R-3	R-4	S
1103.2	R	R	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.3	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.4.1	R	—	R	—	—	—	—	—	—	—	—	—	—	R	R	—	—	—	—	—	—	—
1103.4.2	R	—	R	—	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	—	—	R
1103.4.3	R	—	R	—	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	—	—	R
1103.4.4	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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TABLE 1103.1—OCCUPANCY AND USE REQUIREMENTS[a]—continued

SECTION	USE				OCCUPANCY CLASSIFICATION																
	High-rise	Atrium or covered mall	Under-ground building	Tire storage	A	B	E	F	H-1	H-2	H-3	H-4	H-5	I-2	I-3	I-4	M	R-1	R-2	R-3	R-4	S
1103.4.5	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—
1103.4.6	—	—	—	—	R	—	R	R	R	R	R	R	R	R	R	R	—	R	R	R	R	R
1103.4.7	—	—	—	—	R	—	R	R	R	R	R	R	R	R	R	R	—	R	R	R	R	R
1103.4.8	R	—	R	—	R	R	R	R	R	R	R	R	R	—	—	R	R	R	R	R	R	R
1103.4.9	R	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1103.4.10	—	—	—	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1103.5.1	—	—	—	—	R[c]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.5.2	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1103.5.3	—	—	—	—	—	—	—	—	—	—	—	—	—	R[b]	—	—	—	—	—	—	—	—
1103.5.5	—	—	—	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1103.6.1	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.6.2	R	—	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	—	—	R
1103.7.1	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.7.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1103.7.3	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1103.7.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—
1103.7.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—
1103.7.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—
1103.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	R	R	R	R	—
1103.9	R	—	—	—	—	—	—	—	—	—	—	—	—	R	—	R	—	R	R	R	R	—
1103.10	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1104	R	R	R	—	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
1105	—	—	—	—	—	—	—	—	—	—	—	—	—	R	—	—	—	—	—	—	—	—
1106	—	—	—	R	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

R = The building is required to comply.

a. Existing buildings shall comply with the sections identified as "Required" (R) based on occupancy classification or use, or both, whichever is applicable.

b. Only applies to Group I-2, Condition 2 occupancies as established by the adopting ordinance or legislation of the jurisdiction.

c. Only applies to Group A-2 occupancies where alcoholic beverages are consumed.

1103.1.1 Historic buildings. Facilities designated as historic buildings shall develop a fire protection plan in accordance with NFPA 914. The fire protection plans shall comply with the maintenance and availability provisions in Sections 404.3 and 404.4.

1103.2 Emergency responder communications enhancement in existing buildings. Existing buildings other than Group R-3 that do not have approved in-building emergency response communications enhancement for emergency responders in the building based on existing coverage levels of the public safety communication systems, shall be equipped with such coverage according to one of the following:

1. Where an existing wired communication system cannot be repaired or is being replaced, or where not approved in accordance with Section 510.1, Exception 1.
2. Within a time frame established by the adopting authority.

Exception: Where it is determined by the fire code official that the in-building emergency responder communications enhancement system is not needed.

1103.3 Existing elevators. In other than Group R-3, existing elevators, escalators and moving walks shall comply with the requirements of Sections 1103.3.1 and *1103.3.3*.

➡ **1103.3.1 Elevators, escalators and moving walks.** Existing elevators, escalators and moving walks in Group I-2 occupancies and serving ambulatory care facilities shall comply with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

1103.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for firefighting or rescue

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purposes shall be provided with emergency operation in accordance with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

Exceptions:

1. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where protected at the elevator shaft openings with additional fire doors in accordance with Section 716 of the *California Building Code* and where all of the following conditions are met:
    1.1. The doors shall be provided with vision panels of approved fire-protection-rated glazing so located as to furnish clear vision of the approach to the elevator. Such glazing shall not exceed 100 square inches (0.065 m^2) in area.
    1.2. The doors shall be held open but be automatic-closing by activation of a fire alarm initiating device installed in accordance with the requirements of NFPA 72 as for Phase I Emergency Recall Operation, and shall be located at each floor served by the elevator; in the associated elevator machine room, control space, or control room; and in the elevator hoistway, where sprinklers are located in those hoistways.
    1.3. The doors, when closed, shall have signs visible from the approach area stating: "WHEN THESE DOORS ARE CLOSED OR IN CASE OF FIRE, ELEVATORS ARE OUT OF SERVICE. USE EXIT."
2. Buildings without occupied floors located more than 55 feet (16 764 mm) above or 25 feet (7620 mm) below the lowest level of fire department vehicle access where provided with automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Freight elevators in buildings provided with both automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2 and not less than one ASME 17.3-compliant elevator serving the same floors.

Elimination of previously installed Phase I emergency recall or Phase II emergency in-car systems shall not be permitted.

1103.3.3 Medical emergency elevator. *For existing hoistways with elevator alterations, or replacements, where the elevator car dimensions do not comply with Section 3002.4.1a of the California Building Code. The elevator car dimensions and/or the clear entrance opening dimensions may be altered where it can be demonstrated to the local jurisdictional authority's satisfaction that the proposed configuration will accommodate the designated gurney or stretcher with equivalent ease to the existing car and/or clear entrance conditions. Written documentation from the local authority shall be provided to the California Occupational Safety and Health Elevator Unit.*

1103.4 Vertical openings. Interior vertical openings, including but not limited to stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected as specified in Sections 1103.4.1 through 1103.4.10.

1103.4.1 Group I-2 and I-3 occupancies. In Group I-2 and I-3 occupancies, interior vertical openings connecting two or more stories shall be protected with 1-hour fire-resistance-rated construction.

Exceptions:

1. In Group I-2, unenclosed vertical openings not exceeding two connected stories and not concealed within the building construction shall be permitted as follows:
    1.1. The unenclosed vertical openings shall be separated from other unenclosed vertical openings serving other floors by a smoke barrier.
    1.2. The unenclosed vertical openings shall be separated from corridors by smoke partitions.
    1.3. The unenclosed vertical openings shall be separated from other fire or smoke compartments on the same floors by a smoke barrier.
    1.4. On other than the lowest level, the unenclosed vertical openings shall not serve as a required means of egress.
2. In Group I-2, atriums connecting three or more stories shall not require 1-hour fire-resistance-rated construction where the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3, and all of the following conditions are met:
    2.1. For other than existing approved atriums with a smoke control system, where the atrium was constructed and is maintained in accordance with the code in effect at the time the atrium was created, the atrium shall have a smoke control system that is in compliance with Section 909.
    2.2. Glass walls forming a smoke partition or a glass-block wall assembly shall be permitted where in compliance with Condition 2.2.1 or 2.2.2.
        2.2.1. Glass walls forming a smoke partition shall be permitted where all of the following conditions are met:
            2.2.1.1. Automatic sprinklers are provided along both sides of the separation wall and doors, or on the room side only if there is not a walkway or occupied space on the atrium side.
            2.2.1.2. The sprinklers shall be not more than 12 inches (305 mm) away from the face of the glass and at intervals along the glass of not greater than 72 inches (1829 mm).

2.2.1.3. Windows in the glass wall shall be nonoperating type.

2.2.1.4. The glass wall and windows shall be installed in a gasketed frame in a manner that the framing system deflects without breaking (loading) the glass before the automatic sprinkler system operates.

2.2.1.5. The sprinkler system shall be designed so that the entire surface of the glass is wet upon activation of the automatic sprinkler system without obstruction.

2.2.2. A fire barrier is not required where a glass-block wall assembly complying with Section 2110 of the *California Building Code* and having a $^{3}/_{4}$-hour fire protection rating is provided.

2.3. Where doors are provided in the glass wall, they shall be either self-closing or automatic-closing and shall be constructed to resist the passage of smoke.

3. In Group I-3 occupancies, exit stairways or ramps and exit access stairways or ramps constructed in accordance with Section 408 of the *California Building Code*.

1103.4.2 Three to five stories. In other than Group I-2 and I-3 occupancies, interior vertical openings connecting three to five stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.3 More than five stories. In other than Group I-2 and I-3 occupancies, interior vertical openings connecting more than five stories shall be protected by 1-hour fire-resistance-rated construction.

Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Vertical opening protection for escalators shall be in accordance with Section 1103.4.5, 1103.4.6 or 1103.4.7.
4. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.4 Atriums and covered malls. In other than Group I-2 and I-3 occupancies, interior vertical openings in a covered mall building or a building with an atrium shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system shall be installed throughout the building in accordance with Section 903.3.1.1 or 903.3.1.2.

Exceptions:

1. Vertical opening protection is not required for Group R-3 occupancies.
2. Vertical opening protection is not required for open parking garages.
3. Exit access stairways and ramps shall be in accordance with Section 1103.4.8.

1103.4.5 Escalators in Group B and M occupancies. In Group B and M occupancies, escalators creating vertical openings connecting any number of stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 installed throughout the building, with a draft curtain and closely spaced sprinklers around the escalator opening.

1103.4.6 Escalators connecting four or fewer stories. In other than Group B and M occupancies, escalators creating vertical openings connecting four or fewer stories shall be protected by either 1-hour fire-resistance-rated construction or an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 shall be installed throughout the building, and a draft curtain with closely spaced sprinklers shall be installed around the escalator opening.

1103.4.7 Escalators connecting more than four stories. In other than Group B and M occupancies, escalators creating vertical openings connecting five or more stories shall be protected by 1-hour fire-resistance-rated construction.

1103.4.8 Occupancies other than Groups I-2 and I-3. In other than Group I-2 and I-3 occupancies, floor openings containing exit access stairways or ramps that do not comply with one of the conditions listed in this section shall be protected by 1-hour fire-resistance-rated construction.

1. Exit access stairways and ramps that serve, or atmospherically communicate between, only two stories. Such interconnected stories shall not be open to other stories.
2. In Group R-1, R-2 or R-3 occupancies, exit access stairways and ramps connecting four stories or less serving and contained within an individual dwelling unit or sleeping unit or live/work unit.
3. Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp, and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13. In other than Group B and M occupancies, this provision is limited to openings that do not connect more than four stories.

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4. Exit access stairways and ramps within an atrium complying with the provisions of Section 404 of the *California Building Code*.
5. Exit access stairways and ramps in open parking garages that serve only the parking garage.
6. Exit access stairways and ramps serving open-air seating complying with the exit access travel distance requirements of Section 1030.7 of the *California Building Code*.
7. Exit access stairways and ramps serving the balcony, gallery or press box and the main assembly floor in occupancies such as theaters, places of religious worship, auditoriums and sports facilities.

1103.4.9 Waste and linen chutes. In Group I-2 occupancies, existing waste and linen chutes shall comply with Sections 1103.4.9.1 through 1103.4.9.5.

1103.4.9.1 Enclosure. Chutes shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

1103.4.9.2 Chute intakes. Chute intakes shall comply with Section 1103.4.9.2.1 or 1103.4.9.2.2.

1103.4.9.2.1 Chute intake direct from corridor. Where intake to chutes is direct from a corridor, the intake opening shall be equipped with a chute-intake door in accordance with Section 716 of the *California Building Code* and having a fire protection rating of not less than 1 hour.

1103.4.9.2.2 Chute intake via a chute-intake room. Where the intake to chutes is accessed through a chute-intake room, the room shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives for the intake room shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than $^{3}/_{4}$ hour. Opening protectives for the chute enclosure shall be in accordance with Section 1103.4.9.1.

1103.4.9.3 Automatic sprinkler system. Chutes shall be equipped with an approved automatic sprinkler system in accordance with Section 903.2.11.2.

1103.4.9.4 Chute discharge rooms. Chutes shall terminate in a dedicated chute discharge room. Such rooms shall be separated from the remainder of the building by not less than 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

1103.4.9.5 Chute discharge protection. Chute discharges shall be equipped with a self-closing or automatic-closing opening protective in accordance with Section 716 of the *California Building Code* and having a fire protection rating of not less than 1 hour.

1103.4.10 Flue-fed incinerators. Existing flue-fed incinerator rooms and associated flue shafts shall be protected with 1-hour fire-resistance-rated construction and shall not have other vertical openings connected with the space other than the associated flue. Opening protectives shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

1103.5 Sprinkler systems. An automatic sprinkler system shall be provided in existing buildings in accordance with Sections 1103.5.1 through 1103.5.5.

1103.5.1 Group A-2. Where alcoholic beverages are consumed in a Group A-2 occupancy having an occupant load of 300 or more, the fire area containing the Group A-2 occupancy shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1.

1103.5.2 Group I-2. In Group I-2, an automatic sprinkler system shall be provided in accordance with Section 1105.9.

1103.5.3 Group I-2, Condition 2. In addition to the requirements of Section 1103.5.2, existing buildings of Group I-2, Condition 2 occupancy shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The automatic sprinkler system shall be installed as established by the adopting ordinance. **[DATE BY WHICH SPRINKLER SYSTEM MUST BE INSTALLED].**

1103.5.4 High-rise buildings. Where Appendix M has not been adopted, existing high-rise buildings that do not have a previously approved automatic sprinkler system shall be equipped with an automatic sprinkler system in accordance with Section 903.3.1.1 where any of the following conditions apply:

1. The high-rise building has an occupied floor located more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access.
2. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have at least two interior exit stairways complying with Section 1104.10 that are separated from the building interior by fire assemblies having a fire-resistance rating of not less than 2 hours with opening protection in accordance with Table 716.1(2) of the *California Building Code*.
3. The high-rise building has occupied floors located more than 75 feet (22 860 mm) and not more than 120 feet (36 576 mm) above the lowest level of fire department vehicle access, and the building does not have a fire alarm system that includes smoke detection in mechanical equipment, electrical, transformer, telephone equipment and similar rooms; corridors; elevator lobbies; and at doors penetrating interior exit stairway enclosures.

Building owners shall file a compliance schedule with the fire code official not later than 365 days after receipt of a written notice. The compliance schedule shall not exceed 12 years for completion of the automatic sprinkler system retrofit.

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1103.5.5 Pyroxylin plastics. An automatic sprinkler system shall be provided throughout existing buildings where cellulose nitrate film or pyroxylin plastics are manufactured, stored or handled in quantities exceeding 100 pounds (45 kg). Vaults located within buildings for the storage of raw pyroxylin shall be protected with an approved automatic sprinkler system capable of discharging 1.66 gallons per minute per square foot (68 L/min/m^2) over the area of the vault.

1103.6 Standpipes. Existing structures shall be equipped with standpipes installed in accordance with Section 905 where required in Sections 1103.6.1 and 1103.6.2. The fire code official is authorized to approve the installation of manual standpipe systems to achieve compliance with this section where the responding fire department is capable of providing the required hose flow at the highest standpipe outlet.

1103.6.1 Existing multiple-story buildings. Existing buildings with occupied floors located more than 50 feet (15 240 mm) above the lowest level of fire department access or more than 50 feet (15 240 mm) below the highest level of fire department access shall be equipped with standpipes.

1103.6.2 Existing helistops and heliports. Existing buildings with a rooftop helistop or heliport located more than 30 feet (9144 mm) above the lowest level of fire department access to the roof level on which the helistop or heliport is located shall be equipped with standpipes in accordance with Section 2007.5.

1103.7 Fire alarm systems. An approved fire alarm system shall be installed in existing buildings and structures in accordance with Sections 1103.7.1 through 1103.7.6 and provide occupant notification in accordance with Section 907.5 unless other requirements are provided by other sections of this code. *Existing high-rise buildings shall comply with Section 1103.7.9.*

Exception: Occupancies with an existing, previously approved fire alarm system.

1103.7.1 Group E. A fire alarm system shall be installed in existing Group E occupancies in accordance with Section 907.2.3.

Exceptions:

1. A manual fire alarm system is not required in a building with a maximum area of 1,000 square feet (93 m^2) that contains a single classroom and is located not closer than 50 feet (15 240 mm) from another building.
2. A manual fire alarm system is not required in Group E occupancies with an occupant load less than 50.

1103.7.2 ***Reserved.***

1103.7.3 Group I-2. In Group I-2, an automatic fire alarm system *that activates the occupant notification system in accordance with Section 907.5* shall be installed in accordance with Section 1105.10.

1103.7.3.1 Additional provisions for existing Group I occupancies. *In projects requiring the Office of Statewide Hospital Planning and Development approval in existing Group I-2 occupancies located in buildings defined as hospitals in Section 1250 of the Health and Safety Code, facilities not equipped with an automatic sprinkler system throughout shall be equipped with an automatic fire alarm system which responds to the products of combustion other than heat.*

Exception: *Heat detectors may be used in closets, unusable spaces under floor areas, storage rooms, bathrooms and rooms of similar use.*

1103.7.4 Group I-3. An automatic and manual fire alarm system shall be installed in existing Group I-3 occupancies in accordance with Section 907.2.6.3.

1103.7.5 Group R-1. A fire alarm system and smoke alarms shall be installed in existing Group R-1 occupancies in accordance with Sections 1103.7.5.1 through 1103.7.5.2.1.

1103.7.5.1 Group R-1 hotel and motel manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 hotels and motels more than one story in height or with more than 20 dwelling units or sleeping units in aggregate.

Exceptions:

1. A manual fire alarm system is not required in buildings less than two stories in height where all dwelling units, sleeping units, attics and crawl spaces are separated by 1-hour fire-resistance-rated construction and each sleeping unit has direct access to a public way, egress court or yard.
2. A manual fire alarm system is not required in buildings not more than three stories in height with not more than 20 dwelling units or sleeping units in aggregate and equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
3. Manual fire alarm boxes are not required throughout the building where the following conditions are met:
   - 3.1. The building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.
   - 3.2. The notification appliances will activate upon sprinkler water flow.
   - 3.3. Not less than one manual fire alarm box is installed at an approved location.

1103.7.5.1.1 Group R-1 hotel and motel automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 hotels and motels throughout all interior corridors serving sleeping rooms not equipped with an approved, supervised automatic sprinkler system installed in accordance with Section 903.

Exception: An automatic smoke detection system is not required in buildings that do not have interior corridors serving dwelling units or sleeping units and where each dwelling unit or sleeping unit has a means of egress door opening directly to an exit or to an exterior exit access that leads directly to an exit.

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1103.7.5.2 Group R-1 boarding and rooming houses manual fire alarm system. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 boarding and rooming houses.

Exception: Buildings less than two stories in height where all sleeping units, attics and crawl spaces are separated by 1-hour fire-resistance-rated construction and each dwelling unit or sleeping unit has direct access to a public way, egress court or yard.

1103.7.5.2.1 Group R-1 boarding and rooming houses automatic smoke detection system. An automatic smoke detection system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-1 boarding and rooming houses throughout all interior corridors serving dwelling units or sleeping units not equipped with an approved, supervised sprinkler system installed in accordance with Section 903.

Exception: Buildings equipped with single-station smoke alarms meeting or exceeding the requirements of Section 907.2.11.1 and where the fire alarm system includes not less than one manual fire alarm box per floor arranged to initiate the alarm.

1103.7.6 Group R-2. A manual fire alarm system that activates the occupant notification system in accordance with Section 907.5 shall be installed in existing Group R-2 occupancies more than three stories in height or with more than 16 dwelling or sleeping units.

Exceptions:

1. Where each living unit is separated from other contiguous living units by fire barriers having a fire-resistance rating of not less than $^{3}/_{4}$ hour, and where each living unit has either its own independent exit or its own independent stairway or ramp discharging at grade.
2. A separate fire alarm system is not required in buildings that are equipped throughout with an approved supervised automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2 and having a local alarm to notify all occupants.
3. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units and are protected by an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, provided that dwelling units either have a means of egress door opening directly to an exterior exit access that leads directly to the exits or are served by open-ended corridors designed in accordance with Section 1027.6, Exception 3.
4. A fire alarm system is not required in buildings that do not have interior corridors serving dwelling units, do not exceed three stories in height and comply with both of the following:
    4.1. Each dwelling unit is separated from other contiguous dwelling units by fire barriers having a fire-resistance rating of not less than $^{3}/_{4}$ hour.
    4.2. Each dwelling unit is provided with smoke alarms complying with the requirements of Section 907.2.11.

1103.7.8 Existing Group R-1 and Group R-2 High-rise buildings. *See Section 1113.3.*

1103.7.8.1 General. *Every apartment house and every hotel shall have installed therein an automatic or manually operated fire alarm system. Such fire alarm systems shall be so designed that all occupants of the building may be warned simultaneously.*

1103.7.8.2 Installation. *The installation of all fire alarm equipment shall be in accordance with this code.*

1103.7.9 Existing High-rise Buildings.

1103.7.9.1 Fire alarm system. *Every existing high-rise building shall be provided with an approved fire alarm system. In department stores, retail sales stores and similar occupancies where the general public is admitted, such systems shall be of a type capable of alerting staff and employees. In office buildings and all other high-rise buildings, such systems shall be of a type capable of alerting all occupants simultaneously.*

Exceptions:

1. *In areas of public assemblage, the type and location of audible appliances shall be as determined by the enforcing agency.*
2. *When acceptable to the enforcing agency, the occupant voice notification system required by Section 1114.20 and California Existing Building Code may be used in lieu of the fire alarm system.*

1103.7.9.2 Existing systems. *Existing fire alarm systems, when acceptable to the enforcing agency, shall be deemed as conforming to the provisions of these regulations.*

1103.7.9.3 Annunciation. *When a new fire alarm system is installed, it shall be connected to an annunciator panel installed in a location approved by the enforcing agency.*

For purposes of annunciation, zoning shall be in accordance with Section 907.6.4.4.

1103.7.9.4 Monitoring. *Monitoring shall be in accordance with Section 907.6.6.*

1103.7.9.5 Systems interconnection. *When an automatic fire detection system or automatic extinguishing system is installed, activation of such system shall cause the sounding of the fire alarm notification appliances at locations designated by the enforcing agency.*

1103.7.9.6 Manual fire alarm boxes. *A manual fire alarm box shall be provided in the locations designated by the enforcing agency. Such locations shall be where boxes are readily accessible and visible and in normal paths of daily travel by occupants of the building.*

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1103.7.9.7 Emergency voice/alarm communication system. *Such system shall provide communication from a location available to and designated by the enforcing agency to not less than all public areas.*

The emergency voice/alarm communication system may be combined with a fire alarm system provide the combined system has been approved and listed by the State Fire Marshal. The sounding of a fire alarm signal in any given area or floor shall not prohibit voice communication to other areas of floors. Combination systems shall be designed to permit voice transmission to override the fire alarm signal, but the fire alarm signal shall not terminate in less than three minutes.

1103.7.9.8 Fire department system. *When it is determined by test that portable fire department communication equipment is ineffective, a communication system acceptable to the enforcing agency shall be installed within the building to permit emergency communication between fire-suppression personnel.*

1103.7.9.9 Smoke control systems. *Existing air-circulation systems shall be provided with an override switch in a location approved by the enforcing agency which will allow for the manual control of shutdown of the systems.*

Exception: *Systems which serve only a single floor, or portion thereof, without any penetration by ducts or other means into adjacent floors.*

1103.7.9.10 Elevator recall smoke detection. *Smoke detection for emergency operation of elevators shall be provided in accordance with Section 907.3.3.*

➡ **1103.8 Single- and multiple-station smoke alarms.** Single- and multiple-station smoke alarms shall be installed in existing Group R occupancies in accordance with Sections 1103.8.1 through 1103.8.3.

➡ **1103.8.1 Where required.** Existing Group R occupancies shall be provided with single-station smoke alarms in accordance with Section 907.2.11. Interconnection and power sources shall be in accordance with Sections 1103.8.2 and 1103.8.3, respectively.

Exceptions:

1. Where the code that was in effect at the time of construction required smoke alarms and smoke alarms complying with those requirements are already provided.
2. Where smoke alarms have been installed in occupancies and dwellings that were not required to have them at the time of construction, additional smoke alarms shall not be required provided that the existing smoke alarms comply with requirements that were in effect at the time of installation.
3. Where smoke detectors connected to a fire alarm system have been installed as a substitute for smoke alarms.

1103.8.2 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling or sleeping unit, the smoke alarms shall be interconnected in such a manner that the activation of one alarm will activate all of the alarms in the individual unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed.

Exceptions:

1. Interconnection is not required in buildings that are not undergoing alterations, repairs or construction of any kind.
2. Smoke alarms in existing areas are not required to be interconnected where alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.
3. *Smoke alarms are not required to be interconnected where repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck.*
4. *Smoke alarms are not required to be interconnected when work is limited to the installation, alteration or repairs of plumbing or mechanical systems or the installation, alteration or repair of electrical systems which do not result in the removal of interior wall or ceiling finishes exposing the structure.*

1103.8.3 Power source. Single-station smoke alarms shall receive their primary power from the building wiring provided that such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms with integral strobes that are not equipped with battery backup shall be connected to an emergency electrical system. Smoke alarms shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than as required for overcurrent protection.

Exceptions:

1. Smoke alarms are permitted to be solely battery operated in existing buildings where construction is not taking place.
2. Smoke alarms are permitted to be solely battery operated in buildings that are not served from a commercial power source.
3. Smoke alarms are permitted to be solely battery operated in existing areas of buildings undergoing alterations or repairs that do not result in the removal of interior walls or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for building wiring without the removal of interior finishes.
4. *Smoke alarms are permitted to be solely battery operated where repairs or alterations are limited to the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck.*

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5. *Smoke alarms are permitted to be solely battery operated when work is limited to the installation, alteration or repairs of plumbing or mechanical systems or the installation, alteration or repair of electrical systems which do not result in the removal of interior wall or ceiling finishes exposing the structure.*

1103.8.4 Group R-3.1. *In all facilities housing a bedridden client, smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. Smoke alarms shall be electrically interconnected so as to cause all smoke alarms to sound a distinctive alarm signal upon actuation of any single smoke alarm. Such alarm signal shall be audible throughout the facility at a minimal level of 15 db above ambient noise level. These devices need not be interconnected to any other fire alarm device, have a control panel, or be electrically supervised or provided with emergency power.*

1103.8.5 Additional provisions for existing Group R occupancies.

1103.8.5.1 *Existing Buildings housing Group R occupancies established prior to the effective date of these regulations may have their use continued if they conform or are made to conform to provisions of these regulations to the extent that reasonable and adequate life safety against the hazards of fire, panic and explosion is substantially provided. Additional means of egress, the installation of automatic sprinkler systems, automatic fire alarm system or other life safety measures, may be required to provide reasonable and adequate safety.*

Note: *It is the intent of this section that every existing occupancy need not mandatorily conform with the requirements for new construction. Reasonable judgment in the application of requirements must be exercised by the enforcing agency.*

1103.8.5.2 *For purposes of clarification, Health and Safety Code, Section 13113.7 is repeated.*

(a) Except as otherwise provided in this section, smoke alarms, approved and listed by the State Fire Marshal pursuant to Section 13114 at the time of installation, shall be installed in accordance with the manufacturer's instructions in each dwelling intended for human occupancy:

(1) For all dwelling units intended for human occupancy, upon the owner's application on or after January 1, 1985, for a permit for alterations, repairs or additions, exceeding one thousand dollars ($1,000).

(2) For all other dwelling units intended for human occupancy for which a building permit is issued on or after January 1, 2014, for alterations, repairs or additions exceeding one thousand dollars ($1,000), the permit issuer shall not sign off on the completion of work until the permittee demonstrates that all smoke alarms required for the dwelling unit are devices approved and listed by the State Fire Marshal pursuant to Section 13114.

(3) However, if any local rule, regulation or ordinance, adopted prior to January 1, 1987, requires installation in a dwelling unit intended for human occupancy of smoke alarms which receive their power from the electrical system of the building and requires compliance with the local rule, regulation or ordinance at a date subsequent to the dates specified in this section, the compliance date specified in the rule, regulation or ordinance shall, but only with respect to the dwelling units specified in this section, take precedence over the date specified in this section.

(4) Unless prohibited by local rules, regulations or ordinances, a battery-operated smoke alarm, which otherwise met the standards adopted pursuant to Section 13114 for smoke alarms at the time of installation, satisfies the requirements of this section.

(5) A fire alarm system with smoke detectors installed in accordance with the State Fire Marshal's regulations may be installed in lieu of smoke alarms required pursuant to paragraph (1) or (2) of this subdivision, or paragraph (3) of subdivision (d).

(b) "Dwelling units intended for human occupancy," as used in this section, includes a duplex, lodging house, apartment complex, hotel, motel, condominium, stock cooperative, time-share project or dwelling unit of a multiple-unit dwelling complex. For the purpose of this part, "dwelling units intended for human occupancy" does not include manufactured homes as defined in Section 18007, mobilehomes as defined in Section 18008, and commercial coaches as defined in Section 18001.8.

(c) A high-rise structure, as defined in subdivision (b) of Section 13210 and regulated by Chapter 3 (commencing with Section 13210), and which is used for purposes other than as dwelling units intended for human occupancy, is exempt from the requirements of this section.

(d) (1) The owner shall be responsible for testing and maintaining alarms in hotels, motels, lodging houses, apartment complexes and other multiple-dwelling complexes in which units are neither rented nor leased.

(2) The owner of a hotel, motel, lodging house, apartment complex or other multiple-dwelling complex in which units are rented or leased, and commencing January 1, 2014, the owner of a single-family dwelling that is rented or leased, shall be responsible for testing and maintaining alarms required by this section as follows:

(A) An owner or the owner's agent may enter any dwelling unit, efficiency dwelling unit, guest room and suite owned by the owner for the purpose of installing, repairing, testing and maintaining single station smoke alarms required by this section. Except in cases of emergency, the owner or owner's agent shall give the tenants of each such unit, room or suite reasonable notice in writing of the intention to enter and shall enter only during normal business hours. Twenty-four hours shall be presumed to be reasonable notice in absence of evidence to the contrary.

(B) At the time that a new tenancy is created, the owner shall ensure that smoke alarms are operable. The tenant shall be responsible for notifying the manager or owner if the tenant becomes aware of an inoperable smoke alarm within his or

her unit. The owner or authorized agent shall correct any reported deficiencies in the smoke alarm and shall not be in violation of this section for a deficient smoke alarm when he or she has not received notice of the deficiency.

(3) On or before January 1, 2016, the owner of a dwelling unit intended for human occupancy in which one or more units is rented or leased shall install additional smoke alarms, as needed, to ensure that smoke alarms are located in compliance with current building standards. Existing alarms need not be replaced unless the alarm is inoperable. New smoke alarms installed in compliance with current building standards may be battery operated provided the alarms have been approved by the State Fire Marshal for sale in the state. This paragraph shall not apply to fire alarm systems with smoke detectors, fire alarm devices that connect to a panel, or other devices that use a low-power radio frequency wireless communication signal.

(e) A violation of this section is an infraction punishable by a maximum fine of two hundred dollars ($200) for each offense.

(f) This section shall not affect any rights which the parties may have under any other provision of law because of the presence or absence of a smoke alarm.

(Amended by Stats. 2012, Ch. 420, Sec. 1. Effective January 1, 2013.)

1103.8.5.3 *For purposes of clarification, Health and Safety Code Section 13113.8 is repeated.*

(a) On and after January 1, 1986, every single-family dwelling and factory-built housing, as defined in Section 19971, which is sold shall have an operable smoke detector. The detector shall be approved and listed by the State Fire Marshal and installed in accordance with the State Fire Marshal's regulations. Unless prohibited by local rules, regulations or ordinances, a battery-operated smoke detector shall be deemed to satisfy the requirements of this section.

(b) On and after January 1, 1986, the transferor of any real property containing a single-family dwelling, as described in subdivision (a), whether the transfer is made by sale, exchange or real property sales contract, as defined in Section 2985 of the Civil Code, shall deliver to the transferee a written statement indicating that the transferor is in compliance with this section. The disclosure statement shall be either included in the receipt for deposit in a real estate transaction, an addendum attached thereto, or a separate document.

(c) The transferor shall deliver the statement referred to in subdivision (b) as soon as practicable before the transfer of title in the case of a sale or exchange, or prior to execution of the contract where the transfer is by a real property sales contract, as defined in Section 2985. or purposes of this subdivision, "delivery" means delivery in person or by mail to the transferee or transferor, or to any person authorized to act for him or her in the transaction, or to additional transferees who have requested delivery from the transferor in writing. Delivery to the spouse of a transferee or transferor shall be deemed delivery to a transferee or transferor, unless the contract states otherwise.

(d) This section does not apply to any of the following:

(1) Transfers which are required to be preceded by the furnishing to a prospective transferee of a copy of a public report pursuant to Section 11018.1 of the Business and Professions Code.

(2) Transfers pursuant to court order, including, but not limited to, transfers ordered by a probate court in the administration of an estate, transfers pursuant to a writ of execution, transfers by a trustee in bankruptcy, transfers by eminent domain or transfers resulting from a decree for specific performance.

(3) Transfers to a mortgagee by a mortgagor in default, transfers to a beneficiary of a deed of trust by a trustor in default, transfers by any foreclosure sale after default, transfers by any foreclosure sale after default in an obligation secured by a mortgage, or transfers by a sale under a power of sale after a default in an obligation secured by a deed of trust or secured by any other instrument containing a power of sale.

(4) Transfers by a fiduciary in the course of the administration of a decedent's estate, guardianship, conservatorship or trust.

(5) Transfers from one co-owner to one or more co-owners.

(6) Transfers made to a spouse, or to a person or persons in the lineal line of consanguinity of one or more of the transferors.

(7) Transfers between spouses resulting from a decree of dissolution of a marriage, from a decree of legal separation, or from a property settlement agreement incidental to either of those decrees.

(8) Transfers by the Controller in the course of administering the Unclaimed Property Law provided for in Chapter 7 (commencing with Section 1500) of Title 10 of Part 3 of the Code of Civil Procedure.

(9) Transfers under the provisions of Chapter 7 (commencing with Section 3691) or Chapter 8 (commencing with Section 3771) of Part 6 of Division 1 of the Revenue and Taxation Code.

(e) No liability shall arise, nor any action be brought or maintained against any agent of any party to a transfer of title, including any person or entity acting in the capacity of an escrow, for any error, inaccuracy or omission relating to the disclosure required to be made by a transferor pursuant to this section.

However, this subdivision does not apply to a licensee, as defined in Section 10011 of the Business and Professions Code, where the licensee participates in the making of the disclosure required to be made pursuant to this section with actual knowledge of the falsity of the disclosure.

(f) Except as otherwise provided in this section, this section shall not be deemed to create or imply a duty upon a licensee, as defined in Section 10011 of the Business and Professions Code, or upon any agent of any party to a transfer of title, including any person or entity acting in the capacity of an escrow, to monitor or ensure compliance with this section.

(g) No transfer of title shall be invalidated on the basis of a failure to comply with this section, and the exclusive remedy for the failure to comply with this section is an award of actual damages not to exceed one hundred dollars ($100), exclusive of any court costs and attorney's fees.

(h) Local ordinances requiring smoke detectors in single-family dwellings may be enacted or amended. However, the ordinances shall satisfy the minimum requirements of this section.

(i) For the purposes of this section, "single-family dwelling" does not include a manufactured home as defined in Section 18007, a mobilehome as defined in Section 18008, or a commercial coach as defined in Section 18001.8.

(j) This section shall not apply to the installation of smoke detectors in dwellings intended for human occupancy, as defined in and regulated by Section 13113.7 of the Health and Safety Code, as added by Senate Bill No. 1448 in the 1983-84 Regular Session.

1103.9 Carbon monoxide detection. Carbon monoxide detection shall be installed in existing buildings where any of the conditions identified in Section 915.1.1 exist. Carbon monoxide alarms shall be installed in the locations specified in Section 915.2 and the installation shall be in accordance with Section 915.4.

Exceptions:

1. Carbon monoxide alarms are permitted to be solely battery operated where the code that was in effect at the time of construction did not require carbon monoxide detectors to be provided.
2. Carbon monoxide alarms are permitted to be solely battery operated in dwelling units that are not served from a commercial power source.
3. A carbon monoxide detection system in accordance with Section 915.5 shall be an acceptable alternative to carbon monoxide alarms.

1103.9.1 Carbon monoxide detection in existing Group E buildings. *For the purposes of carbon monoxide detection, an existing Group E is a building constructed before January 1, 2017. When an existing Group E occupancy has a fossil-fuel-burning furnace located inside the building, the school is encouraged to install carbon monoxide detection in accordance with the California Existing Building Code.*

No person shall install, market, distribute, offer for sale or sell any carbon monoxide device in the state of California unless the device and instructions have been approved and listed by the Office of the State Fire Marshal.

1103.10 Medical gases. Medical gases stored and transferred in health-care-related facilities shall be in accordance with Chapter 53.

SECTION 1104—MEANS OF EGRESS FOR EXISTING BUILDINGS

1104.1 General. Means of egress in existing buildings shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25, and the building code that applied at the time of construction. Where the provisions of this chapter conflict with the building code that applied at the time of construction, the most restrictive provision shall apply. Existing buildings that were not required to comply with a building code at the time of construction shall comply with the minimum egress requirements where specified in Table 1103.1 as further enumerated in Sections 1104.2 through 1104.25.

1104.2 Elevators, escalators and moving walks. Elevators, escalators and moving walks shall not be used as a component of a required means of egress.

Exceptions:

1. Elevators used as an accessible means of egress where allowed by Section 1009.4.
2. Previously approved elevators, escalators and moving walks in existing buildings.

1104.3 Exit sign illumination. Exit signs shall be internally or externally illuminated. The face of an exit sign illuminated from an external source shall have an intensity of not less than 5 footcandles (54 lux). Internally illuminated signs shall provide equivalent luminance and be listed for the purpose.

Exception: Approved self-luminous signs that provide evenly illuminated letters shall have a minimum luminance of 0.06 foot-lamberts (0.21 cd/m^2).

1104.4 Power source. Where emergency illumination is required in Section 1104.5, exit signs shall be visible under emergency illumination conditions.

Exception: Approved signs that provide continuous illumination independent of external power sources are not required to be connected to an emergency electrical system.

1104.5 Illumination emergency power. Where means of egress illumination is provided, the power supply for means of egress illumination shall normally be provided by the premises' electrical supply. In the event of power supply failure, illumination shall be automatically provided from an emergency system for the following occupancies where such occupancies require two or more means of egress:

1. Group A having 50 or more occupants.

   Exception: Assembly occupancies used exclusively as a place of worship and having an occupant load of less than 300.

2. Group B buildings three or more stories in height, buildings with 100 or more occupants above or below a level of exit discharge serving the occupants or buildings with 1,000 or more total occupants.
3. Group E in interior exit access and exit stairways and ramps, corridors, windowless areas with student occupancy, shops and laboratories.
4. Group F having more than 100 occupants.

   Exception: Buildings used only during daylight hours and that are provided with windows for natural light in accordance with the *California Building Code*.
5. Group I.
6. Group M.

   Exception: Buildings less than 3,000 square feet (279 m^2) in gross sales area on one story only, excluding mezzanines.
7. Groups R-1 and R-2.

   Exception: Where each dwelling unit or sleeping unit has direct access to the outside of the building at grade.

1104.5.1 Emergency power duration and installation. Emergency power for means of egress illumination shall be provided in accordance with Section 1203. In other than Group I-2, emergency power shall be provided for not less than 60 minutes for systems requiring emergency power.

1104.6 Guards. Guards complying with this section shall be provided at the open sides of means of egress that are more than 30 inches (762 mm) above the floor or grade below.

1104.6.1 Height of guards. Guards shall form a protective barrier not less than 42 inches (1067 mm) high.

Exceptions:

1. Existing guards on the open side of exit access and exit stairways and ramps shall be not less than 30 inches (760 mm) high.
2. Existing guards within dwelling units shall be not less than 36 inches (910 mm) high.
3. Existing guards in assembly seating areas.

1104.6.2 Opening limitations. Open guards shall have balusters or ornamental patterns such that a 6-inch-diameter (152 mm) sphere cannot pass through any opening up to a height of 34 inches (864 mm).

Exceptions:

1. At elevated walking surfaces for access to, and use of, electrical, mechanical or plumbing systems or equipment, guards shall have balusters or be of solid materials such that a sphere with a diameter of 21 inches (533 mm) cannot pass through any opening.
2. In occupancies in Group I-3, F, H or S, the clear distance between intermediate rails measured at right angles to the rails shall not exceed 21 inches (533 mm).
3. Approved existing open guards.

1104.7 Size of doors. The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of 28 inches (711 mm). Where this section requires a minimum clear opening width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a clear opening width of 28 inches (711 mm). The minimum clear opening height of doorways shall be 80 inches (2032 mm).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not part of the required means of egress in occupancies in Group R-2 and R-3 units that are not required to be an Accessible unit, Type A unit or Type B unit.
2. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
3. The width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
4. The maximum width of door leaves in power-operated doors that comply with Section 1010.3.2 shall not be limited.
5. Door openings within a dwelling unit shall have a minimum clear opening height of 78 inches (1981 mm).
6. In dwelling and sleeping units that are not required to be Accessible units, Type A units or Type B units, exterior door openings, other than the required exit door, shall have a minimum clear opening height of 76 inches (1930 mm).
7. Exit access doors serving a room not larger than 70 square feet (6.5 m^2) shall have a minimum door leaf width of 24 inches (610 mm).
8. The minimum clear opening width shall not apply to doors for nonaccessible showers or sauna compartments.
9. The minimum clear opening width shall not apply to the doors for nonaccessible toilet stalls.
10. Door closers, overhead door stops, frame stops, power door operators and electromagnetic door locks shall be permitted to project into the door opening height not lower than 78 inches (1980 mm) above the floor.

1104.7.1 Group I-2. In Group I-2 occupancies, means of egress doors where used for the movement of beds shall provide a minimum clear opening width of $41^1/_2$ inches (1054 mm).

Doors serving as means of egress doors and not used for movement of beds shall provide a minimum clear opening width of 32 inches (813 mm).

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1104.7.2 Ambulatory care. In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a minimum clear opening width of 32 inches (813 mm).

1104.8 Forces to unlatch and open doors. Forces required to unlatch and open doors shall be in accordance with Sections 1104.8.1 and 1104.8.2. ⬅

1104.8.1 Unlatching doors. The forces to unlatch doors shall comply with the following:

1. Where door hardware operates by push or pull, the operational force to unlatch the door shall not exceed 15 pounds (67 N).
2. Where door hardware operates by rotation, the operational force to unlatch the door shall not exceed 28 inch-pounds (3.164 N-m).

1104.8.2 Opening doors. The forces to open doors shall comply with the following:

1. For interior swinging egress doors that are manually operated, other than doors required to be fire rated, the force for pushing or pulling open the door shall not exceed 5 pounds (22 N).
2. For other swinging doors, sliding doors or folding doors and doors required to be fire-rated, the door shall require not more than a 30-pound (133 N) force to be set in motion and shall move to a full-open position when subjected to not more than a 15-pound (67 N) force.

1104.9 Revolving doors. Revolving doors shall comply with the following:

1. A revolving door shall not be located within 10 feet (3048 mm) of the foot or top of stairways or escalators. A dispersal area shall be provided between the stairways or escalators and the revolving doors.
2. The revolutions per minute for a revolving door shall not exceed those shown in Table 1104.9.
3. Each revolving door shall have a conforming side-hinged swinging door in the same wall as the revolving door and within 10 feet (3048 mm).

Exceptions:

1. A revolving door is permitted to be used without an adjacent swinging door for street-floor elevator lobbies provided that a stairway, escalator or door from other parts of the building does not discharge through the lobby and the lobby does not have any occupancy or use other than as a means of travel between elevators and a street.
2. Existing revolving doors where the number of revolving doors does not exceed the number of swinging doors within 20 feet (6096 mm).

TABLE 1104.9—REVOLVING DOOR SPEEDS

INSIDE DIAMETER (feet-inches)	POWER-DRIVEN-TYPE SPEED CONTROL (rpm)	MANUAL-TYPE SPEED CONTROL (rpm)
6-6	11	12
7-0	10	11
7-6	9	11
8-0	9	10
8-6	8	9
9-0	8	9
9-6	7	8
10-0	7	8

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

1104.9.1 Egress component. A revolving door used as a component of a means of egress shall comply with Section 1104.9 and all of the following conditions:

1. Revolving doors shall not be given credit for more than 50 percent of the required egress capacity.
2. Each revolving door shall be credited with not more than a 50-person capacity.
3. Revolving doors shall be capable of being collapsed when a force of not more than 130 pounds (578 N) is applied within 3 inches (76 mm) of the outer edge of a wing.

1104.10 Stair dimensions for existing stairways. Existing stairways in buildings shall be permitted to remain if the rise does not exceed $8^1/_4$ inches (210 mm) and the run is not less than 9 inches (229 mm). Existing stairways can be rebuilt.

Exception: Other stairways approved by the fire code official.

1104.10.1 Dimensions for replacement stairways. The replacement of an existing stairway in a structure shall not be required to comply with the new stairway requirements of Section 1011 where the existing space and construction will not allow a reduction in pitch or slope.

1104.11 Winders. Existing winders shall be allowed to remain in use if they have a minimum tread depth of 6 inches (152 mm) and a minimum tread depth of 9 inches (229 mm) at a point 12 inches (305 mm) from the narrowest edge.

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1104.12 Curved stairways. Existing curved stairways shall be allowed to continue in use, provided that the minimum depth of tread is 10 inches (254 mm) and the smallest radius shall be not less than twice the width of the stairway.

1104.13 Stairway handrails. Stairways shall have handrails on at least one side. Handrails shall be located so that all portions of the stairway width required for egress capacity are within 44 inches (1118 mm) of a handrail.

Exception: Aisle stairs provided with a center handrail are not required to have additional handrails.

1104.13.1 Height. Handrail height, measured above stair tread nosings, shall be uniform, not less than 30 inches (762 mm) and not more than 42 inches (1067 mm).

1104.14 Slope of ramps. Ramp runs utilized as part of a means of egress shall have a running slope not steeper than 1 unit vertical in 10 units horizontal (10-percent slope). The slope of other ramps shall not be steeper than 1 unit vertical in 8 units horizontal (12.5-percent slope).

1104.15 Width of ramps. Existing ramps are permitted to have a minimum width of 30 inches (762 mm) but not less than the width required for the number of occupants served as determined by Section 1005.1. In Group I-2, ramps serving as a means of egress and used for the movement of patients in beds shall comply with Section 1105.6.4.

[BE] 1104.16 Fire escape stairways. Fire escape stairways shall comply with Sections 1104.16.1 through 1104.16.6.

[BE] 1104.16.1 Existing means of egress. Fire escape stairways shall be permitted in existing buildings but shall not constitute more than 50 percent of the required exit capacity.

[BE] 1104.16.2 Opening protectives. Doors and windows within 10 feet (3048 mm) of fire escape stairways shall be protected with $^{3}/_{4}$-hour opening protectives.

Exception: Opening protectives shall not be required in buildings equipped throughout with an approved automatic sprinkler system.

[BE] 1104.16.3 Dimensions. Fire escape stairways shall meet the minimum width, capacity, riser height and tread depth as specified in Section 1104.10.

[BE] 1104.16.4 Access. Access to a fire escape stairway from a corridor shall not be through an intervening room. Access to a fire escape stairway shall be from a door or window meeting the criteria of Section 1005.1. Access to a fire escape stairway shall be directly to a balcony, landing or platform. These shall not be higher than the floor or windowsill level and not lower than 8 inches (203 mm) below the floor level or 18 inches (457 mm) below the windowsill.

[BE] 1104.16.5 Materials and strength. Components of fire escape stairways shall be constructed of noncombustible materials. Fire escape stairways and balconies shall support the dead load plus a live load of not less than 100 pounds per square foot (4.78 kN/m^2). Fire escape stairways and balconies shall be provided with a top and intermediate handrail on each side.

[BE] 1104.16.6 Termination. The lowest balcony shall not be more than 18 feet (5486 mm) from the ground. Fire escape stairways shall extend to the ground or be provided with counterbalanced stairs reaching the ground.

Exception: For fire escape stairways serving 10 or fewer occupants, an approved fire escape ladder is allowed to serve as the termination.

1104.17 Corridor construction. Corridors serving an occupant load greater than 30 and the openings therein shall provide an effective barrier to resist the movement of smoke. Transoms, louvers, doors and other openings shall be kept closed or be self-closing. In Group I-2, corridors in areas housing patient sleeping or care rooms shall comply with Section 1105.5.

Exceptions:

1. Corridors in occupancies other than in Group H, that are equipped throughout with an approved automatic sprinkler system.
2. Corridors in occupancies in Group E where each room utilized for instruction or assembly has not less than one-half of the required means of egress doors opening directly to the exterior of the building at ground level.
3. Corridors that are in accordance with the *California Building Code*.

1104.17.1 Corridor openings. Openings in corridor walls shall comply with the requirements of the *California Building Code*.

Exceptions:

1. Where 20-minute fire door assemblies are required, solid wood doors not less than 1.75 inches (44 mm) thick or insulated steel doors are allowed.
2. Openings protected with fixed wire glass set in steel frames.
3. Openings covered with 0.5-inch (12.7 mm) gypsum wallboard or 0.75-inch (19.1 mm) plywood on the room side.
4. Opening protection is not required where the building is equipped throughout with an approved automatic sprinkler system.

1104.18 Dead ends. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that dead ends do not exceed the limits specified in Table 1104.18.

Exceptions:

1. A dead-end corridor shall not be limited in length where the length of the dead-end corridor is less than 2.5 times the least width of the dead-end corridor.

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2. In existing buildings, existing dead-end corridors shall be permitted to comply with lengths established in Section 804.8 of the *California Existing Building Code*. Any newly constructed dead-end *corridors* within an existing building shall be limited to the lengths allowed by the *California Building Code*.

TABLE 1104.18—COMMON PATH, DEAD-END AND TRAVEL DISTANCE LIMITS (by occupancy)

OCCUPANCY	COMMON PATH OF EGRESS TRAVEL LIMIT		DEAD-END LIMIT		EGRESS ACCESS TRAVEL DISTANCE LIMIT	
	Unsprinklered (feet)	Sprinklered (feet)	Unsprinklered (feet)	Sprinklered (feet)[j]	Unsprinklered (feet)	Sprinklered (feet)
Group A	75	20/75[j]	20[a]	20[a]	200	250[j]
Group B[h]	75[g]	100[j]	50	50	200	300[j]
Group E	75	75[j]	20	50	200	250[j]
Group F-1, S-1	75[g]	100[j]	50	50	200[c]	250[c, h, j]
Group F-2, S-2	75[g]	100[j]	50	50	300	400[j]
Group H-1	25	25[l]	0	0	75	75[j, l]
Group H-2	50	100[l]	0	0	75	100 [j, l]
Group H-3	50	100[l]	20	20	100	150[j, l]
Group H-4	75	75[l]	20	20	150	175[j, l]
Group H-5	75	75[l]	20	50	150	200[j, l]
Group I-2	Notes d, e, f	Notes d, e, f, j	Note e	Note e	150	200[b, j]
Group I-3	100	100[j]	NR	NR	150[b]	200[b, j]
Group I-4	NR	NR	20	20	200	250[j]
Group M	75	100[j]	50	50	200	250[i, j]
Group R-1	75	75[j, k]	50	50	200	250[j, k]
Group R-2	75	125[j, k]	50	50	200	250[j, k]
Group R-3	NR	NR	NR	NR	NR	NR
Group R-4	NR	NR	NR	NR	NR	NR
Group U	75[g]	100[j]	20	50	300	400[j]

NR = No Requirements.

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. See Section 1030.9.5 for dead-end aisles in Group A occupancies.
b. This dimension is for the total travel distance, assuming incremental portions have fully utilized their allowable maximums. For travel distance within the room, and from the room exit access door to the exit, see the appropriate occupancy chapter.
c. See Section 412 of the *California Building Code* for special requirements on spacing of doors in aircraft hangars.
d. Separation of exit access doors within a care recipient sleeping room, or any suite that includes care recipient sleeping rooms, shall comply with Section 1105.6.7.
e. In smoke compartments containing care recipient sleeping rooms and treatment rooms, dead-end corridors shall comply with Section 1105.6.6.
f. In Group I-2, care recipient sleeping rooms or any suite that includes care recipient sleeping rooms shall comply with Section 1105.7.
g. Where a tenant space in Group B, S and U occupancies has an occupant load of not more than 30, the length of a common path of egress travel shall be not more than 100 feet.
h. Where the building, or portion of the building, is limited to one story and the height from the finished floor to the bottom of the ceiling or roof slab or deck is 24 feet or more, the exit access travel distance is increased to 400 feet.
i. For covered and open malls, the exit access travel distance is increased to 400 feet.
j. Buildings equipped with an *approved* automatic sprinkler system in accordance with Section 903.3.1.1.
k. Buildings equipped with an *approved* automatic sprinkler system in accordance with Section 903.3.1.2.
l. Group H occupancies equipped with an *approved* automatic sprinkler system in accordance with Section 903.2.5.

1104.19 Exit access travel distance. Exits shall be located so that the maximum length of exit access travel, measured from the most remote point to an approved exit along the natural and unobstructed path of egress travel, does not exceed the distances given in Table 1104.18.

1104.20 Common path of egress travel. The common path of egress travel shall not exceed the distances given in Table 1104.18.

1104.21 Stairway discharge identification. An interior exit stairway or ramp that continues below its level of exit discharge shall be arranged and marked to make the direction of egress to a public way readily identifiable.

Exception: Stairways that continue one-half story beyond their levels of exit discharge need not be provided with barriers where the exit discharge is obvious.

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1104.22 Exterior stairway protection. Exterior exit stairways shall be separated from the interior of the building as required in Section 1027.6. Openings shall be limited to those necessary for egress from normally occupied spaces.

Exceptions:

1. Separation from the interior of the building is not required for buildings that are two stories or less above grade where the level of exit discharge serving such occupancies is the first story above grade.
2. Separation from the interior of the building is not required where the exterior stairway is served by an exterior balcony that connects two remote exterior stairways or other approved exits with a perimeter that is not less than 50 percent open. To be considered open, the opening shall be not less than 50 percent of the height of the enclosing wall, with the top of the opening not less than 7 feet (2134 mm) above the top of the balcony.
3. Separation from the interior of the building is not required for an exterior stairway located in a building or structure that is permitted to have unenclosed interior stairways in accordance with Section 1023.
4. Separation from the open-ended corridors of the building is not required for exterior stairways provided that:
   - 4.1. The open-ended corridors comply with Section 1020.
   - 4.2. The open-ended corridors are connected on each end to an exterior exit stairway complying with Section 1027.
   - 4.3. At any location in an open-ended corridor where a change of direction exceeding 45 degrees (0.79 rad) occurs, a clear opening of not less than 35 square feet (3 m^2) or an exterior stairway shall be provided. Where clear openings are provided, they shall be located so as to minimize the accumulation of smoke or toxic gases.

1104.23 Minimum aisle width. The minimum clear width of aisles shall comply with the following:

1. Forty-two inches (1067 mm) for stepped aisles having seating on each side.

   Exception: Thirty-six inches (914 mm) where the stepped aisle serves fewer than 50 seats.
2. Thirty-six inches (914 mm) for stepped aisles having seating on only one side.

   Exceptions:
   1. Thirty inches (760 mm) for catchment areas serving not more than 60 seats.
   2. Twenty-three inches (584 mm) between a stepped aisle handrail and seating where a stepped aisle does not serve more than five rows on one side.
3. Twenty inches (508 mm) between a stepped aisle handrail or guard and seating where the aisle is subdivided by a mid-aisle handrail.
4. Forty-two inches (1067 mm) for level or ramped aisles having seating on both sides.

   Exceptions:
   1. Thirty-six inches (914 mm) where the aisle serves fewer than 50 seats.
   2. Thirty inches (760 mm) where the aisle serves fewer than 15 seats and does not serve as part of an accessible route.
5. Thirty-six inches (914 mm) for level or ramped aisles having seating on only one side.

   Exception: Thirty inches (760 mm) for catchment areas serving not more than 60 seats and not serving as part of an accessible route.
6. In Group I-2, where aisles are used for movement of patients in beds, aisles shall comply with Section 1105.6.8.

1104.24 Stairway floor number signs. Existing stairways shall be marked in accordance with Section 1023.9.

1104.25 Egress path markings. Existing high-rise buildings of Group A, B, E, I, M and R-1 occupancies shall be provided with luminous egress path markings in accordance with Section 1025.

Exception: Open, unenclosed stairwells in historic buildings designated as historic under a state or local historic preservation program.

SECTION 1105 —CONSTRUCTION REQUIREMENTS FOR EXISTING GROUP I-2

1105.1 General. Existing Group I-2 shall meet all of the following requirements:

1. The minimum fire safety requirements in Section 1103.
2. The minimum means of egress requirements in Section 1104.
3. The additional egress and construction requirements in Section 1105.

Where the provisions of this chapter conflict with the construction requirements that applied at the time of construction, the most restrictive provision shall apply.

1105.2 Applicability. The provisions of Sections 1105.3 through 1105.8, 1105.10 and 1105.11 shall apply to the existing Group I-2 fire area.

➡ **1105.3 Construction.** Group I-2 shall not be located on a floor level higher than the floor level limitation in Table 1105.3 based on the type of construction.

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TABLE 1105.3—FLOOR LEVEL LIMITATIONS FOR GROUP I-2, CONDITION 2					
CONSTRUCTION TYPE	AUTOMATIC SPRINKLER SYSTEM	ALLOWABLE FLOOR LEVEL[a]			
		1	2	3	4 or more
IA	Note b	P	P	P	P
	Note c	P	P	P	P
IB	Note b	P	P	P	P
	Note c	P	P	P	P
IIA	Note b	P	P	P	NP
	Note c	P	NP	NP	NP
IIB	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
IIIA	Note b	P	P	NP	NP
	Note c	P	NP	NP	NP
IIIB	Note b	P	NP	NP	NP
	Note c	NP	NP	NP	NP
IV	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
VA	Note b	P	P	NP	NP
	Note c	NP	NP	NP	NP
VB	Note b	P	NP	NP	NP
	Note c	NP	NP	NP	NP

P = Permitted; NP = Not Permitted.

a. Floor level shall be counted based on the number of stories above grade.

b. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

c. The building is equipped with an automatic sprinkler system in accordance with Section 1105.8.

1105.4 Incidental uses in existing Group I-2. Incidental uses associated with and located within existing single-occupancy or mixed-occupancy Group I-2 buildings and that generally pose a greater level of risk to such occupancies shall comply with the provisions of Sections 1105.4.1 through 1105.4.3.2.1. Incidental uses in Group I-2 occupancies are limited to those listed in Table 1105.4.

TABLE 1105.4—INCIDENTAL USES IN EXISTING GROUP I-2 OCCUPANCIES	
ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	2 hours
Incinerator rooms	2 hours and provide automatic sprinkler system
Paint shops not classified as Group H	2 hours; or 1 hour and provide automatic sprinkler system
Laboratories and vocational shops, not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
Patient rooms equipped with padded surfaces	1 hour or provide automatic sprinkler system
Physical plant maintenance shops	1 hour or provide automatic sprinkler system
Waste and linen collection rooms with containers with total volume of 10 cubic feet or greater	1 hour or provide automatic sprinkler system
Storage rooms greater than 100 square feet	1 hour or provide automatic sprinkler system
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptable power supplies	2 hours

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

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1105.4.1 Occupancy classification. Incidental uses shall not be individually classified in accordance with Section 302.1 of the *California Building Code*. Incidental uses shall be included in the building occupancies within which they are located.

1105.4.2 Area limitations. Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.

1105.4.3 Separation and protection. The incidental uses listed in Table 1105.4 shall be separated from the remainder of the building or equipped with an automatic sprinkler system, or both, in accordance with the provisions of that table.

1105.4.3.1 Separation. Where Table 1105.4 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building in accordance with Section 509.4.1 of the *California Building Code*.

1105.4.3.2 Protection. Where Table 1105.4 permits an automatic sprinkler system without a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke in accordance with Section 509.4.2 of the *California Building Code*.

1105.4.3.2.1 Protection limitation. Except as otherwise specified in Table 1105.4 for certain incidental uses, where an automatic sprinkler system is provided in accordance with Table 1105.4, only the space occupied by the incidental use need be equipped with such a system.

1105.5 Corridor construction. In Group I-2, in areas housing patient sleeping or care rooms, corridor walls and the opening protectives therein shall provide a barrier designed to resist the passage of smoke in accordance with Sections 1105.5.1 through 1105.5.7.

1105.5.1 Materials. The walls shall be of materials permitted by the building type of construction.

1105.5.2 Fire-resistance rating. Unless required elsewhere in this code, corridor walls are not required to have a fire-resistance rating. Corridor walls that were installed as fire-resistance-rated assemblies in accordance with the applicable codes under which the building was constructed, remodeled or altered shall be maintained unless modified in accordance with the *California Existing Building Code*.

1105.5.3 Corridor wall continuity. Corridor walls shall extend from the top of the foundation or floor below to one of the following:

1. The underside of the floor or roof sheathing, deck or slab above.
2. The underside of a ceiling above where the ceiling membrane is constructed to limit the passage of smoke.
3. The underside of a lay-in ceiling system where the ceiling system is constructed to limit the passage of smoke and where the ceiling tiles weigh not less than 1 pound per square foot (4.88 kg/m^2) of tile.

1105.5.4 Openings in corridor walls. Openings in corridor walls shall provide protection in accordance with Sections 1105.5.4.1 through 1105.5.4.3.

1105.5.4.1 Windows. Windows in corridor walls shall be sealed to limit the passage of smoke, or the window shall be automatic-closing upon detection of smoke, or the window opening shall be protected by an automatic closing device that closes upon detection of smoke.

Exception: In smoke compartments not containing patient sleeping rooms, pass-through windows or similar openings shall be permitted in accordance with Section 1105.5.4.3.

1105.5.4.2 Doors. Doors in corridor walls shall comply with Sections 1105.5.4.2.1 through 1105.5.4.2.3.

1105.5.4.2.1 Louvers. Doors in corridor walls shall not include louvers, transfer grills or similar openings.

Exception: Doors shall be permitted to have louvers, transfer grills or similar openings at toilet rooms or bathrooms; storage rooms that do not contain storage of flammable or combustible material; and storage rooms that are not required to be separated as incidental uses.

1105.5.4.2.2 Corridor doors. Doors in corridor walls shall limit the transfer of smoke by complying with the following:

1. Doors shall be constructed of not less than $1^3/_4$ inch-thick (44 mm) solid bonded-core wood or capable of resisting fire not less than $^1/_3$ hour.

   Exception: Corridor doors in buildings equipped throughout with an automatic sprinkler system.
2. Frames for side-hinged swinging doors shall have stops on the sides and top to limit transfer of smoke.
3. Where provided, vision panels in doors shall be a fixed glass window assembly installed to limit the passage of smoke. Existing wired glass panels with steel frames shall be permitted to remain in place.
4. The clearance between the bottom of the door and floor shall not exceed 1 inch (25 mm).
5. Doors shall be positive latching with devices that resist not less than 5 pounds (22.2 N). Roller latches are prohibited.
6. Mail slots or similar openings shall be permitted in accordance with Section 1105.5.4.3.

1105.5.4.2.3 Dutch doors. Where provided, Dutch doors shall comply with Section 1105.5.4.2.2. In addition, Dutch doors shall be equipped with latching devices on either the top or bottom leaf to allow leaves to latch together. The space between the leaves shall be protected with devices such as astragals to limit the passage of smoke.

1105.5.4.2.4 Self- or automatic-closing doors. Where self- or automatic-closing doors are required, closers shall be maintained in operational condition. Hold-open devices on doors shall be capable of manual release.

1105.5.4.2.5 Protective plates. Protective plates installed on corridor doors shall not be limited in size.

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1105.5.4.3 Openings in corridor walls and doors. In other than smoke compartments containing patient sleeping rooms, mail slots, pass-through windows or similar openings shall not be required to be protected where the aggregate area of the openings between the corridor and a room are not greater than 80 square inches (51 613 mm^2) and are located with the top edge of any opening not higher than 48 inches above the floor.

1105.5.5 Penetrations. The space around penetrating items shall be filled with an approved material to limit the passage of smoke.

1105.5.6 Joints. Joints shall be filled with an approved material to limit the passage of smoke.

1105.5.7 Ducts and air transfer openings. The space around a duct penetrating a smoke partition shall be filled with an approved material to limit the passage of smoke. Air transfer openings in smoke partitions shall be provided with a smoke damper complying with Section 717.3.2.2 of the *California Building Code*.

Exception: Where the installation of a smoke damper will interfere with the operation of a required smoke control system in accordance with Section 909, approved alternative protection shall be utilized.

1105.6 Means of egress. In addition to the means of egress requirements in Section 1104, Group I-2 facilities shall meet the means of egress requirements in Sections 1105.6.1 through 1105.6.8.

1105.6.1 Two means of egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which the means of egress originated. Smoke compartments that do not contain an exit shall be provided with direct access to not less than two adjacent smoke compartments.

1105.6.2 Size of door. Means of egress doors used for the movement of patients in beds shall provide a minimum clear width of $41^1/_2$ inches (1054 mm). The height of the door opening shall be not less than 80 inches (2032 mm).

Exceptions:

1. Door closers and door stops shall be permitted to be 78 inches (1981 mm) minimum above the floor.
2. In Group I-2, existing means of egress doors used for the movement of patients in beds that provide a minimum clear width of 32 inches (813 mm) shall be permitted to remain.

1105.6.3 Group I-2 occupancies. In Group I-2, where a door serves as an opening protective in a fire barrier, smoke barrier or fire wall and where the door is equipped with a hold-open device, such door shall automatically close upon any of the following conditions:

1. Actuation of smoke detectors initiating the hold-open device.
2. Activation of the fire alarm system within the zone.
3. Activation of an automatic sprinkler system within the zone.

1105.6.4 Ramps. In areas where ramps are used for movement of patients in beds, the clear width of the ramp shall be not less than 48 inches (1219 mm).

1105.6.5 Corridor width. In areas where corridors are used for movement of patients in beds, the clear width of the corridor shall be not less than 48 inches (1219 mm).

1105.6.6 Dead-end corridors. In smoke compartments containing patient sleeping rooms and treatment rooms, dead-end corridors shall not exceed 30 feet (9144 mm) unless approved by the fire code official.

1105.6.7 Separation of exit access doors. Patient sleeping rooms, or any suite that includes patient sleeping rooms, of more than 1,000 square feet (92.9 m^2) shall have not less than two exit access doors placed a distance apart equal to not less than one-third of the length of the maximum overall diagonal dimension of the patient sleeping room or suite to be served, measured in a straight line between exit access doors.

1105.6.8 Aisles. In areas where aisles are used for movement of patients in beds, the clear width of the aisle shall be not less than 48 inches (1219 mm).

1105.7 Smoke compartments. Smoke compartments shall be provided in existing Group I-2, Condition 2, in accordance with Sections 1105.7.1 through 1105.7.6.

1105.7.1 Design. Smoke barriers shall be provided to subdivide each story used for patients sleeping with an occupant load of more than 30 patients into not fewer than two smoke compartments.

1105.7.1.1 Refuge areas. Refuge areas shall be provided within each smoke compartment. The size of the refuge area shall accommodate the occupants and care recipients from the adjoining smoke compartment. Where a smoke compartment is adjoined by two or more smoke compartments, the minimum area of the refuge area shall accommodate the largest occupant load of the adjoining compartments.

The size of the refuge area shall provide the following:

1. Not less than 30 net square feet (2.8 m^2) for each care recipient confined to a bed or stretcher.
2. Not less than 15 square feet (1.4 m^2) for each resident in a Group I-2 using mobility assistance devices.
3. Not less than 6 square feet (0.56 m^2) for each occupant not addressed in Items 1 and 2.

Areas of spaces permitted to be included in the calculation of the refuge area are corridors, sleeping areas, treatment rooms, lounge or dining areas and other low-hazard areas.

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1105.7.2 Smoke barriers. Smoke barriers shall be constructed in accordance with Section 709 of the *California Building Code*.

Exceptions:

1. Existing smoke barriers are permitted to remain where the existing smoke barrier has a minimum fire-resistance rating of $^1/_2$ hour.
2. Smoke barriers shall be permitted to terminate at an atrium enclosure in accordance with Section 404.6 of the *California Building Code*.

1105.7.3 Opening protectives. Openings in smoke barriers shall be protected in accordance with Section 716 of the *California Building Code*. Opening protectives shall have a minimum fire protection rating of $^1/_3$ hour.

Exceptions:

1. Existing wired glass vision panels in doors shall be permitted to remain.
2. Existing nonlabeled protection plates shall be permitted to remain.

1105.7.4 Penetrations. Penetrations of smoke barriers shall comply with the *California Building Code*.

Exception: Approved existing materials and methods of construction.

1105.7.5 Joints. Joints made in or between smoke barriers shall comply with the *California Building Code*.

Exception: Approved existing materials and methods of construction.

1105.7.6 Duct and air transfer openings. Penetrations in a smoke barrier by duct and air transfer openings shall comply with Section 717 of the *California Building Code*.

Exception: Where existing duct and air transfer openings in smoke barriers exist without smoke dampers, they shall be permitted to remain. Any changes to existing smoke dampers shall be submitted for review and approved in accordance with Section 717 of the *California Building Code*.

1105.8 Group I-2 care suites. Care suites in existing Group I-2, Condition 2 occupancies shall comply with Sections 407.4.4 through 407.4.4.7.2 of the *California Building Code*.

1105.9 Group I-2 automatic sprinkler system. An automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be provided throughout the floor containing the Group I-2 fire area. The sprinkler system shall be provided throughout the floor where the Group I-2 occupancy is located, on all floors between the Group I-2 occupancy fire area and the level of exit discharge, the level of exit discharge, and all floors below the level of exit discharge.

Exception: Floors classified as an open parking garage are not required to be sprinklered.

1105.10 Group I-2 automatic fire alarm system. An automatic fire alarm system shall be installed in existing Group I-2 occupancies in accordance with Section 907.2.6.2.

Exception: Manual fire alarm boxes in patient sleeping areas shall not be required at exits if located at all nurses' control stations or other constantly attended staff locations, provided such that manual fire alarm boxes are visible, are provided with ready access, and travel distances required in Section 907.4.2.1 are not exceeded.

1105.11 Essential electrical systems. Essential electrical systems in Group I-2, Condition 2 occupancies shall be in accordance with Sections 1105.11.1 and 1105.11.2.

1105.11.1 Where required. Where required by NFPA 99, Group I-2, Condition 2 occupancies shall be provided with an essential electrical system in accordance with NFPA 99.

1105.11.2 Installation and duration. In Group I-2, Condition 2 occupancies, the installation and duration of operation of existing essential electrical systems shall be based on a hazard vulnerability analysis conducted in accordance with NFPA 99.

1105.12 Group I-2 separations between construction areas. *In an existing Group I-2 occupancy, areas of construction, alteration or demolition shall be separated from occupied portions of the building. Where, in accordance with Section 701.2, the maintenance of fire-resistance-rated construction is not required, separations used to separate areas of construction, alteration, or demolition from occupied portions of the building shall be constructed of materials that comply with one of the following:*

1. *Floors and nonbearing walls and partitions in accordance with California Building Code Chapter 6 and Table 601.*
2. *Noncombustible nonbearing walls and partitions.*

1105.12.1 Minor work*. Where minor building work identified in California Building Code Section 105.2, Item 7 is provided with a separation from occupied portions of the building, materials that provide such separation shall be approved by the fire code official and shall comply with one of the following:*

1. *Floors and nonbearing walls and partitions in accordance with California Building Code Chapter 6 and Table 601.*
2. *Noncombustible nonbearing walls and partitions.*
3. *Materials that exhibit a flame spread index not exceeding 25 when tested in accordance with ASTM E84 or UL 723.*
4. *Materials exhibiting a heat peak release rate not exceeding 300 kW/m² when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m² in the horizontal orientation on specimens at the thickness intended for use.*

SECTION 1106—REQUIREMENTS FOR OUTDOOR OPERATIONS

1106.1 Tire storage yards. Existing tire storage yards shall be provided with fire apparatus access roads in accordance with Sections 1106.1.1 and 1106.1.2.

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1106.1.1 Access to piles. Access roadways shall be within 150 feet (45 720 mm) of any point in the storage yard where storage piles are located not less than 20 feet (6096 mm) from any storage pile.

1106.1.2 Location within piles. Fire apparatus access roads shall be located within all pile clearances identified in Section 3405.4 and within all fire breaks required in Section 3405.5.

SECTION 1107—ENERGY STORAGE SYSTEMS

1107.1 Lithium-ion technology energy storage systems. The owner of an energy storage system (ESS) utilizing lithium-ion battery technology having capacities exceeding the values in Table 1207.1.3 and installed prior to the jurisdiction's adoption of the 2018 or later edition of the *California Fire Code* shall provide the fire code official a failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis in accordance with Section 104.2.2 for review and approval.

Exception: Detached one- and two-family dwellings and townhouses.

1107.1.1 Early detection. In addition to the requirements of Sections 1207.1.8.1 and 1207.1.8.2, the analysis shall include an assessment of the ability of the installed protection systems to provide for early detection and notification of a thermal runaway event in relation to the ability of emergency responders to safely mitigate the size and impact of a thermal runaway event.

1107.1.2 Corrective action plan. Where hazards are identified by the analysis, a plan that includes a timetable for corrective action shall be submitted to the fire code official for review and approval. The plan shall include actions and system improvements necessary for eliminating or mitigating any identified hazards, including listed methods for early detection and notification of a thermal runaway event.

SECTION 1108—GROUP A PUBLIC ADDRESS SYSTEM

1108.1 Group A occupancy public address system. *Existing buildings or structures intended for public assemblies of 10,000 or more persons, which, on or after January 1, 1991, have or subsequently have installed a public address system, shall have an emergency backup power system for the public address system.*

SECTIONS 1109 THROUGH 1112—RESERVED

SECTION 1113—EXISTING GROUP R-1 AND GROUP R-2 OCCUPANCIES [SFM]

1113.1 Scope. *The provisions of this section are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings classified as Group R Occupancies.*

1113.1.1 Application. *In accordance with Health and Safety Code Section 13143.2, the provisions of Sections 1113.2 through 1113.12 shall only apply to multiple-story structures existing on January 1, 1975, let for human habitation, including, and limited to, apartment houses, hotels and motels wherein rooms used for sleeping are let above the ground floor.*

1113.2 Number of exits. *Every apartment and every other sleeping room shall have access to not less than two exits when the occupant load is 10 or more (exits need not be directly from the apartment or sleeping room). A fire escape as specified herein may be used as one required exit.*

Subject to approval of the authority having jurisdiction, a ladder device as specified herein may be used in lieu of a fire escape when the construction feature or the location of the building on the property cause the installation of a fire escape to be impractical.

1113.3 Stair construction. *All stairs shall have a minimum run of 9 inches (229 mm) and a maximum rise of 8 inches (203 mm) and a minimum width exclusive of handrails of 30 inches (762 mm). Every stairway shall have at least one handrail. A landing having a minimum horizontal dimension of 30 inches (762 mm) shall be provided at each point of access to the stairway.*

1113.4 Interior stairways. *Every interior stairway shall be enclosed with walls of not less than one-hour fire-resistive construction. Where existing partitions form part of a stairwell enclosure, wood lath and plaster in good condition will be acceptable in lieu of one-hour fire-resistive construction. Doors to such enclosures shall be protected by a self-closing door equivalent to a solid wood door with a thickness of not less than $1^3/_4$ inches (44.5 mm).*

Enclosures shall include all landings between flights and any corridors, passageways or public rooms necessary for continuous exit to the exterior of the buildings. The stairway need not be enclosed in a continuous shaft if cut off at each story by the fire-resistive construction required by this subsection for stairwell enclosures. Enclosures shall not be required if an automatic sprinkler system is provided for all portions of the building except bedrooms, apartments and rooms accessory thereto. Interior stairs and vertical openings need not be enclosed in two-story buildings.

1113.5 Exterior stairways. *Exterior stairways shall be noncombustible or of wood of not less than 2-inch (51 mm) nominal thickness with solid treads and risers.*

1113.6 Fire escapes, exit ladder devices. *Fire escapes may be used as one means of egress if the pitch does not exceed 60 degrees, the width is not less than 18 inches (457 mm), the treads are not less than 4 inches (102 mm) wide, and they extend to the ground or are provided with counterbalanced stairs reaching to the ground. Access shall be by an opening having a minimum dimension of 29 inches (737 mm) when open. The sill shall not be more than 30 inches (762 mm) above the floor and landing.*

A ladder device, when used in lieu of a fire escape, shall conform to Section 1113.6.1 and the following:

Serves an occupant load of nine people or less or a single dwelling unit or hotel room.

The building does not exceed three stories in height.

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The access is adjacent to an opening as specified for emergency egress or rescue or from a balcony.

The device does not pass in front of any building opening below the unit being served.

The availability of activating the ladder device is accessible only to the opening or balcony served.

The device as installed will not cause a person using it to be within 12 feet (3658 mm) of exposed energized high-voltage conductors.

1113.6.1 Exit ladder devices.

1113.6.1.1 Scope. *This standard for exit ladder devices is applicable where such devices are permitted by the building official for installation on existing apartment houses and hotels in conformance with the California Building Code.*

1113.6.1.2 Instructions. *Installation shall be in accordance with the manufacturer's instructions. Instructions shall be illustrated and shall include directions and information adequate for attaining proper and safe installation of the product. Where exit ladder devices are intended for mounting on different support surfaces, specific installation instructions shall be provided for each surface.*

1113.6.1.3 General design. *All load-bearing surfaces and supporting hardware shall be of noncombustible materials. Exit ladder devices shall have a minimum width of 12 inches (305 mm) when in the position intended for use. The design load shall not be less than 400 pounds (1780 N) for 16-foot (4877 mm) length and 600 pounds (2699 N) for 25-foot (7620 mm) length.*

1113.6.1.4 Performance.

1113.6.1.4.1 *Exit ladder devices shall be capable of withstanding an applied load of four times the design load when installed in the manner intended for use. Test loads shall be applied for a period of one hour.*

1113.6.1.4.2 *Exit ladder devices of the retractable type shall, in addition to the static load requirements of Section 413.6.1.4.1 of the California Building Code, be capable of withstanding the following tests:*

1. *Rung strength*
2. *Rung-to-side-rail shear strength*
3. *Release mechanism*
4. *Low temperature*

1113.6.1.5 Rung-strength test. *Rungs of retractable exit ladder devices shall be capable of withstanding a load of 1,000 pounds (4448 N) when applied to a $3^1/_2$-inch-wide (89 mm) block resting at the center of the rung. The test load shall be applied for a period of one hour. The ladder shall remain operational following this test.*

1113.6.1.6 Rung-to-side-rail shear test. *Rungs of retractable exit ladder devices shall be capable of withstanding 1,000 (4448 N) when applied to a $3^1/_2$-inch-wide (89 mm) block resting on the center rung as near the side rail as possible. The test load shall be applied for a period of one hour. Upon removal of the test load the fasteners attaching the rung to the side rail shall show no evidence of failure. The ladder shall remain operational following the test.*

1113.6.1.7 Release mechanism test. *The release mechanism of retractable exit ladder devices shall operate with an average applied force of not more than 5 pounds (22.2 N) for hand-operated releasing mechanisms and an average applied force of not more than 25 pounds (111 N) for foot-pedal types of releasing mechanisms. For these tests, a force gauge shall be applied to the release mechanism, and the average of three consecutive readings shall be computed.*

1113.6.1.8 Low temperature operation test. *Representative samples of the exit ladder devices shall be subjected to a temperature of -40°C in an environmental chamber for a period of 24 hours. The release mechanism shall be operated immediately upon removal from the chamber. The ladder device shall function as intended without any restriction of operation.*

1113.7 Doors and openings. *Exit doors and openings shall meet the requirements of Sections 1008.1.2, 1008.8.1.8, 1008.1.9 and 708.6 of the California Building Code. Doors shall not reduce the required width of stairway more than 6 inches (152 mm) when open. Transoms and openings other than doors from corridors to rooms shall be fixed closed and shall be covered with a minimum of $^3/_4$-inch (19 mm) plywood or $^1/_2$-inch (13 mm) gypsum wallboard or equivalent material.*

Exceptions:

1. *Existing solid-bonded wood-core doors $1^3/_8$ inches thick (34.9 mm), or their equivalent may be continued in use.*
2. *Where the existing frame will not accommodate a door complying with Section 708.6 of the California Building Code, a $1^3/_8$-inch-thick (35 mm) solid-bonded wood-core door may be used.*

1113.8 Exit signs. *Every exit doorway or change of direction of a corridor shall be marked with a well-lighted exit sign having letters at least 5 inches (127 mm) high.*

1113.9 Enclosure of vertical openings. *Elevators, shafts, ducts and other vertical openings shall be enclosed as required for stairways in Section 1113.5 or by wired glass set in metal frames. Doors shall be noncombustible or as regulated in Section 1113.4.*

1113.10 Separation of occupancies. *Occupancy separations shall be provided as specified in Section 508 of the California Building Code. Lobbies and public dining rooms, not including cocktail lounges, shall not require a separation if the kitchen is so separated from the dining room. Every room containing a boiler or central heating plant shall be separated from the rest of the building by not less than a one-hour fire-resistive occupancy separation.*

Exception: *A separation shall not be required for such rooms with equipment serving only one dwelling unit.*

1113.11 Equivalent protection. *In lieu of the separation of occupancies required by Section 1113.10, equivalent protection may be permitted when approved by the enforcement agency.*

Exception: *The provisions of Sections 1113.3 through 1113.11 above shall not apply to any existing apartment house, hotel or motel having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22 860 mm) above the lowest floor level having building access which is subject to the provisions of Section 1114 and the California Existing Building Code, relating to existing high-rise buildings.*

Note: *In accordance with Health and Safety Code Section 17920.7, the provisions of Sections 1113.3 through 1113.11 above shall apply only to multiple-story structures existing on January 1, 1975, let for human habitation including, and limited to, apartments, houses, hotels and motels wherein rooms used for sleeping are let above the ground floor.*

1113.12 Fire alarms.

1113.12.1 General. *Every apartment house three or more stories in height or containing more than 15 apartments, every hotel three or more stories in height or containing 20 or more guest rooms, shall have installed therein an automatic or manually operated fire alarm system. Such fire alarm systems shall be so designed that all occupants of the building may be warned simultaneously and shall be in accordance with the California Fire Code. See Section 1114.14 for special requirements in buildings over 75 feet (22 860 mm) in height.*

Exception: *A fire alarm system need not be installed provided such apartment house or hotel is separated by an unpierced wall of not less than four-hour fire resistance in buildings of Type IA, Type IIB, Type III or Type IV construction and two-hour fire resistance in buildings of all other types of construction provided:*

1. *Areas do not exceed the number of apartments or guest rooms stipulated.*
2. *The fire-resistive wall conforms to the requirements of Section 706.6 of the California Building Code.*
3. *The wall complies with all other applicable provisions of the California Building Code.*
4. *The wall extends to all outer edges of horizontal projecting elements, such as balconies, roof overhangs, canopies, marquees or architectural projections.*
5. *No openings are permitted for air ducts or similar penetrations, except that openings for pipes, conduits and electrical outlets of copper, sheet steel or ferrous material shall be permitted through such wall and need not be protected, provided they do not unduly impair the required fire resistance of the assembly.*
6. *Tolerances around such penetrations shall be filled with approved noncombustible materials.*

1113.12.2 Installation. *The installation of all fire alarm equipment shall be in accordance with the California Fire Code.*

1113.13 Existing Group R Occupancy high-rise buildings.

1113.13.1 General. *Regardless of other provisions of these regulations relating to existing high-rise buildings, requirements relative to existing Group R-1 or Group R-2 Occupancies shall not be less restrictive than those established pursuant to Health and Safety Code Section 13143.2.*

1113.13.2 Corridor openings. *Openings in corridor walls and ceilings shall be protected by not less than $1^{3}/_{4}$-inch (44.5 mm) solid-bonded wood-core doors, $^{1}/_{4}$-inch-thick (6 mm) wired glass conforming to Section 715.1 of the California Building Code, by approved fire dampers or by equivalent protection in lieu of any of these items. Transoms shall be fixed closed with material having a fire-resistive rating equal to $^{1}/_{2}$-inch (12.7 mm) Type X gypsum wallboard or equivalent material installed on both sides of the opening.*

1113.13.3 Fire alarm systems. *Notwithstanding the provisions of Section 403 of the California Building Code, every existing high-rise building used for the housing of a Group R-1 or Group R-2 Occupancies shall have installed therein a fire alarm system conforming to this subsection.*

1113.13.3.1 General. *Every apartment house and every hotel shall have installed therein an automatic or manually operated fire alarm system. Such fire alarm systems shall be so designed that all occupants of the building may be warned simultaneously.*

1113.13.3.2 Installation. *The installation of all fire alarm equipment shall be in accordance with the California Fire Code.*

1113.13.3.3 Fire-extinguishing systems. *Automatic fire-extinguishing systems installed in any structure subject to these regulations shall have an approved flow indicator electrically interconnected to the required fire alarm system.*

SECTION 1114—EXISTING HIGH-RISE BUILDINGS [SFM]

1114.1 Scope and definition. *The provisions of Sections 1114.1 through 1114.27 shall apply to every existing high-rise building of any type of construction or occupancy having floors (as measured from the top of the floor surface) used for human occupancy located more than 75 feet (22 860 mm) above the lowest floor level having building access.*

Exceptions:

1. *Hospitals, as defined in Section 1250 of the Health and Safety Code.*
2. *The following structures, while classified as high-rise buildings, shall not be subject to the provisions of Sections 1114.1 through 1114.27, but shall conform to all applicable provisions of these regulations.*
   - *2.1. Building used exclusively as open parking garages.*
   - *2.2. Buildings where all floors above the 75 foot (22 860 mm) level are used exclusively as open parking garages.*
   - *2.3. Floors of buildings used exclusively as open parking garages and located above all other floors used for human occupancy.*

2.4. *Buildings such as power plants, look-out towers, steeples, grain houses and similar structures, when so determined by the enforcing agency.*

2.5. *Buildings used exclusively for jails and prisons. For the purposes of this section, "building access" shall mean an exterior door opening conforming to all of the following:*

1. *Suitable and available for fire department use.*
2. *Located not more than 2 feet (610 mm) above the adjacent ground level.*
3. *Leading to a space, room or area having foot traffic communication capabilities with the remainder of the building.*
4. *Designed to permit penetration through the use of fire department forcible-entry tools and equipment unless other approved arrangements have been made with the fire authority having jurisdiction.*

"Existing high-rise structure" means a high-rise structure, the construction of which is commenced or completed prior to July 1, 1974.

For the purpose of this section, construction shall be deemed to have commenced when plans and specifications are more than 50 percent complete and have been presented to the local jurisdiction prior to July 1, 1974. Actual construction of such buildings shall commence on or before January 1, 1976, unless all provisions for new buildings have been met.

***Note:** It is the intent of this section that, in determining the level form which the highest occupied floor is to be measured, the enforcing agency should exercise reasonable judgment, including consideration of overall accessibility to the building by fire department personnel and vehicular equipment. When a building is situated on sloping terrain and there is building access on more than one level, the enforcing agency may select the level which provides the most logical and adequate fire department access.*

***1114.2 Compliance data.** Except as may be otherwise specified, existing high-rise building shall conform to the applicable requirements of these regulations by April 26, 1979.*

***Exception:** The period of compliance may be extended upon showing of good cause for such extension if a systematic and progressive plan of correction is submitted to, and approved by, the enforcing agency. Such extension shall not exceed two years from the date of approval of such plan. Any plan of correction submitted pursuant to this exception shall be submitted and approved on or before April 26, 1979.*

***1114.3 Continued use.** Existing high-rise building may have their use continued if they conform, or are made to conform, to the intent of the provisions of Sections 1114.5 through 1114.27 to provide for the safety of the occupants of the high-rise buildings and person involved in fire-suppression activities.*

***1114.4 Alternate protection.** Alternate means of egress, fire walls or fire barriers, smoke barriers, automatic fire detection or fire-extinguishing systems, or other fire-protection devices, equipment or installations may be approved by the enforcing agency to provide reasonable and adequate life safety as intended by Sections 1114.5 through 1114.27 for existing high-rise buildings.*

***1114.5 Basic provisions.** The provisions outlined in Sections 1114.1 through 1114.27 are applicable to every existing highrise building.*

***1114.6 Minimum construction.** Existing wood lath and plaster, existing $^{1}/_{2}$-inch (12.7 mm) gypsum wallboard, existing installations of $^{1}/_{2}$-inch thick (12.7 mm) wired glass which are or are rendered inoperative and fixed in a closed position, or other existing materials having similar fire-resistive capabilities shall be acceptable. All such assemblies shall be in good repair, free of any condition which would diminish their original fire-resistive characteristics.*

Where $1^{3}/_{4}$-inch (44.5 mm) solid-bonded wood-core doors are specified in these regulations for existing high-rise buildings, new or existing $1^{3}/_{8}$-inch (34.9 mm) doors shall be acceptable where existing framing will not accommodate a $1^{3}/_{4}$-inch (44.5 mm) door.

***Note:** It is the intent of this provisions that existing wood frames may have their use continued.*

***1114.7 New construction.** All new construction shall be composed of materials and assemblies of materials conforming to the fire-resistive provisions of these regulations. In no case shall enclosure walls be required to be of more than one-hour fire-resistive construction.*

***Exception:** When approved by the enforcing agency, materials specified in Section 1114.6 may be used for new construction when necessary to maintain continuity of design and measurement of existing construction.*

***1114.8 Exits.** Every floor from an existing high-rise building shall have access to two separate means of egress, one of which, when approved by the enforcing agency, may be an existing exterior fire escape. New installations of smoke-proof enclosures shall not be required.*

***Note:** In determining the adequacy of exits and their design, Chapter 10 of the California Building Code may be used as a guide. It is the intent of this section that every existing high-rise building need not mandatorily conform or be made to conform with the requirements for new high-rise buildings. Reasonable judgment in the application of requirements must be exercised by the enforcing agency.*

***1114.9 Fire escapes.** An existing fire escape in good structural condition may be acceptable as one of the required means of egress from each floor. Access to such fire escapes may be by any one of the following:*

Through a room between the corridor and the fire escape if the door to the room is operable from the corridor side without the use of any key, special knowledge or effort.

By a door operable to a fire escape from the interior without the use of any key, special knowledge or effort.

By a window operable from the interior. Such window shall have a minimum dimension of 29 inches (737 mm) when open.

The sill shall not be more than 30 inches (762 mm) above the floor and landing.

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1114.10 Protection of exterior openings. *When an existing fire escape is accepted as one of the require means of egress, openings onto the fire escape landing and openings within 5 feet (1524 mm) horizontally of the landings shall be protected in a manner acceptable to the enforcing agency.*

1114.11 Locking of stairway doors. *When exit doors from corridors to exit stairways are locked to prohibit access from the stairway side, the locking mechanisms shall be retracted to the unlocked position upon failure of electrical power and a telephone or other two-way communication system connected to an approved emergency service that operates continuously shall be provided at not less than every fifth floor in each required stairway. In lieu thereof, master keys which will unlock all such doors from the stairway side shall be provided in such numbers and locations as approved by the enforcing agency.*

1114.12 Enclosures. *Interior vertical shafts, including but not limited to, elevators, stairway and utility, shall be enclosed with construction as set forth in Section 1114.6.*

1114.13 Opening protection. *Doors in other than elevators, which shall be of a type acceptable to the enforcing agency, shall be approved one-hour, fire-rated, tight-fitting or gasketed doors or equivalent protection, and shall be of the normally closed type, self-closing or a type which will close automatically in accordance with Section 715 of the California Building Code.*

Exception: *In lieu of stairway enclosures, smoke barriers may be provided in such a manner that fire and smoke will not spread to other floors or otherwise impair exit facilities. In these instances, smoke barriers shall not be less than one-hour fire resistive with openings protected by not less than approved one-third-hour, fire-rated, tight-fitting or gasketed doors. Such doors shall be of the self-closing type or of a type which will close automatically in the manner specified in Section 715 of the California Building Code.*

Doors crossing corridors shall be provided with wired-glass vision panels set in approved steel frames. Doors for elevators shall not be of the open-grille type.

1114.14 Fire alarm system. *Every existing high-rise building shall be provided with an approved fire alarm system. In department stores, retail sales stores and similar occupancies where the general public is admitted, such systems shall be of a type capable of alerting staff and employees. In office buildings and all other high-rise buildings, such systems shall be of a type capable of alerting all occupants simultaneously.*

Exceptions:

1. *In areas of public assemblage, the type and location of audible appliances shall be as determined by the enforcing agency.*
2. *When acceptable to the enforcing agency, the occupant voice notification system required by Section 1114.20 may be used in lieu of the fire alarm system required by Section 1114.14.*

1114.15 Existing systems. *Existing fire systems, when acceptable to the enforcing agency, shall be deemed as conforming to the provisions of these regulations. For requirements for existing Group R-1 Occupancies, see Section 312.13 of the California Building Code.*

1114.16 Annunciation. *When a new fire alarm system is installed, it shall be connected to an annunciator panel installed in a location approved by the enforcing agency. For purposes of annunciation, zoning shall be in accordance with Section 907.6.3 of the California Building Code.*

1114.17 Monitoring. *Shall be in accordance with Section 907.6.5 of the California Building Code.*

1114.18 Systems interconnection. *When an automatic fire detection system or automatic extinguishing system is installed, activation of such system shall cause the sounding of the fire alarm notification appliances at locations designated by the enforcing agency.*

1114.19 Manual fire alarm boxes. *A manual fire alarm box shall be provided in the locations designated by the enforcing agency. Such locations shall be where boxes are readily accessible and visible and in normal paths of daily travel by occupants of the building.*

1114.20 Emergency voice/alarm communication system. *An approved emergency voice/alarm system shall be provided in every existing high-rise building which exceeds 150 feet (45 720 mm) in height measured in the manner set forth in Section 312.1 of the California Building Code. Such system shall provide communication from a location available to and designated by the enforcing agency to not less than all public areas. The emergency voice/alarm system may be combined with a fire alarm system provide the combined system has been approved and listed by the State Fire Marshal. The sounding of a fire alarm signal in any given area or floor shall not prohibit voice communication to other areas of floors. Combination systems shall be designed to permit voice transmission to override the fire alarm signal, but the fire alarm signal shall not terminate in less than three minutes.*

1114.21 Fire department system. *When it is determined by test that portable fire department communication equipment is ineffective, a communication system acceptable to the enforcing agency shall be installed within the building to permit emergency communication between fire-suppression personnel.*

1114.22 Interior wall and ceiling finish. *Interior wall and ceiling finish of exitways shall conform to the provisions of Chapter 8 of the California Building Code. Where the materials used in such finishes do not conform to the provisions of Chapter 8 of the California Building Code, such finishes may be surfaced with an approved fire-retardant coating.*

1114.23 Ventilation. *Natural or mechanical ventilation for the removal of products of combustion shall be provided in every story of an existing high-rise building. Such ventilation shall be any one or combination of the following: Panels or windows in the exterior wall which can be opened. Such venting facilities shall be provided at the rate of at least 20 square feet (1.86 m^2) of opening per 50 lineal feet (15 240 lineal mm) of exterior wall in each story, distributed around the perimeter at not more than 50-foot (15 240 mm) intervals on at least two sides of the building. Approved fixed tempered glass may be used in lieu of openable panels or windows. When only selected panels or windows are of tempered glass, they shall be clearly identified as required by the enforcing agency. Any other design which will produce equivalent results.*

1114.24 Smoke control systems. *Existing air-circulation systems shall be provided with an override switch in a location approved by the enforcing agency which will allow for the manual control of shutdown of the systems.*

Exception: *Systems which serve only a single floor, or portion thereof, without any penetration by ducts or other means into adjacent floors.*

1114.25 Elevator recall smoke detection. *Smoke detectors for emergency operation of elevators shall be provided as required by Section 3003 of the California Building Code.*

1114.26 Exit signs and illumination. *Exits and stairways shall be provided with exit signs and illumination as required by Sections 1011.1 and 1011.2 of the California Building Code.*

1114.27 Automatic sprinkler system–Existing high-rise buildings. *Regardless of any other provisions of these regulations, every existing high-rise building of Type II-B, Type III-B or Type V-B construction shall be provided with an approved automatic sprinkler system conforming to NFPA 13.*

SECTION 1115—EXISTING GROUP I OCCUPANCIES [SFM]

1115.1 General. *Existing buildings housing existing protective social-care homes or facilities established prior to March 4, 1972 may have their use continued if they conform, or are made to conform, to the following provisions:*

1115.2 Use of floors. *The use of floor levels in buildings of Type III, IV or V nonfire-rated construction may be as follows: Nonambulatory—first floor only; Ambulatory—not higher than the third-floor level, provided walls and partitions are constructed of materials equal in fire-resistive quality to that of wood lath and plaster in good repair and all walls are firestopped at each floor level.*

1115.3 Enclosure of exits and vertical openings. *Except for two-story structures housing ambulatory guests, all interior stairs shall be enclosed in accordance with Chapter 10 of the California Building Code. In lieu of stairway enclosures, floor separations or smoke barriers may be provided in such a manner that fire and smoke will not spread rapidly to floors above or otherwise impair exit facilities. In these instances, floor separations or smoke barriers shall have a fire resistance equal to not less than $^{1}/_{2}$-inch (13 mm) gypsum wall board on each side of wood studs with openings protected by not less than a $1^{3}/_{4}$-inch (44.5 mm) solid bonded wood-core door of the self-closing type. All other vertical openings shall be enclosed in accordance with the provisions of Sections 1114.6 and 1114.13.*

1115.4 Exit access. *Each floor or portion thereof of buildings used for the housing of existing protective social-care homes or facilities shall have access to not less than two exits in such a manner as to furnish egress from the building or structure in the event of an emergency substantially equivalent to the provisions of Chapter 10 of the California Building Code.*

1115.5 Corridor openings. *Openings from rooms to interior corridors shall be protected by not less than $1^{3}/_{4}$-inch (44.5 mm) solid-bonded wood-core doors. Transoms and other similar openings shall be sealed with materials equivalent to existing corridor wall construction.*

1115.6 Interior finishes. *Interior wall and ceiling finishes shall conform to the requirements for a Group R-1 Occupancy as specified in Chapter 8 of the California Building Code.*

1115.7 Automatic fire sprinklers. *Automatic sprinkler systems shall be installed in existing protective social-care occupancies in accordance with the provisions of Section 903.2.6 of the California Building Code.*

1115.8 Fire alarm systems. *Automatic fire alarm systems shall be installed in existing protective social-care homes or facilities in accordance with the provisions of Section 907.2.6 of the California Building Code.*

Exception: *When an approved automatic sprinkler system conforming to Section 903.2.6 of the California Building Code is installed, a separate fire alarm system as specified in this section need not be provided.*

SECTION 1116—EXISTING GROUP L AND GROUP H-8 OCCUPANCIES [SFM]

1116.1 Repairs general. *Additions, alterations or repairs may be made to any building or structure without requiring the existing building or structure to comply with all the requirements of this code section, provided the addition, alteration or repair conforms to the requirements of this section.*

1116.2 Unsafe condition. *Additions, repairs or alterations shall not be made to an existing building or structure that will cause the existing building or structure to be in violation of any of the provisions of this code, nor shall such additions or alterations cause the existing building or structure to become unsafe, or to be in violation of any of the provisions of this code. An unsafe condition shall be deemed to have been created if an addition or alteration will cause the existing building or structure to become structurally unsafe or overloaded; will not provide adequate egress in compliance with the provisions of this code or will obstruct existing exits; will create a fire hazard; will reduce required fire resistance or will otherwise create conditions dangerous to human life.*

1116.3 Changes in use or occupancy. *Any buildings that have alternations or additions, which involves a change in use or occupancy, shall not exceed the height, number of stories and area permitted for new buildings.*

1116.4 Buildings not in compliance with code. *Additions or alterations shall not be made to an existing building or structure when such existing building or structure is not in full compliance with the provisions of this code except when such addition or alteration will result in the existing building or structure being no more hazardous, based on life safety, fire safety and sanitation, than before such additions or alterations are undertaken.*

1116.5 Maintenance of structural and fire resistive integrity. *Alterations or repairs to an existing building or structure that are nonstructural and do not adversely affect any structural member of any part of the building or structure having required fire resistance may be made with the same materials of which the building or structure is constructed. The installation or replacement of glass shall be as required for new installations.*

1116.6 Continuation of existing use. *Buildings in existence at the time of the adoption of this code may have their existing use or occupancy continued if such use or occupancy was legal at the time of the adoption of this code, provided such continued use is not dangerous to life.*

1116.7 Maximum allowable quantities. *Existing Group H-8 laboratory suites approved prior to January 1, 2008 shall not exceed the maximum allowable quantities listed in Tables 1116.7(1) and 1116.7(2).*

TABLE 1116.7(1)–EXEMPT AMOUNTS OF HAZARDOUS MATERIALS, LIQUIDS AND CHEMICALS PRESENTING A PHYSICAL HAZARD BASIC QUANTITIES PER LABORATORY SUITE[1]

When two units are given, values within parentheses are in cubic feet (cu. ft) or pounds (lb)

CONDITION		STORAGE			USE CLOSED SYSTEMS			USE OPEN SYSTEMS		
MATERIAL	CLASS	Solid Pounds (cu. ft)	Liquid Gallons (lb)	Gas (cu. ft)	Solid Pounds (cu. ft)	Liquid Gallons (lb)	Gas (cu. ft)	Solid Pounds (cu. ft)	Liquid Gallons (lb)	Gas (cu. ft)
1.1 Combustible liquid	II	—	120[2]	—	—	120	—	—	30	—
	III-A	—	330[2]	—	—	330	—	—	80	—
	III-B	—	13,200[2]	—	—	13,200	—	—	3,300	—
1.2 Combustible dust lbs./1000 cu. ft.		1	—	—	1	—	—	1	—	—
1.3 Combustible fiber (loose) (baled)		(100) (1,000)	— —	— —	(100) (1,000)	— —	— —	(20) (200)	— —	— —
1.4 Cryogenic, flammable or oxidizing		—	45	—	—	45	—	—	10	—
2.1 Explosives		12	(1)[2]	—	1/4	(1/4)	—	1/4	(1/4)	—
3.1 Flammable solid		125[2]	—	—	25	—	—	25	—	—
3.2 Flammable gas (gaseous) (liquefied)		— —	— 15[2]	750[2] —	— —	— 15[2]	750[2] —	— —	— —	— —
3.3 Flammable liquid combination I-A, I-B, I-C	I-A	—	30[2]	—	—	30	—	—	10	—
	I-B	—	60[2]	—	—	60	—	—	15	—
	I-C	—	90[2]	—	—	90	—	—	20	—
		—	120[2]	—	—	120	—	—	30	—
4.1 Organic peroxide, unclassified detonatable		1[2]	(1)[2]	—	1/4	(1/4)	—	1/4	(1/4)	—
4.2 Organic peroxide	I	5[2]	(5)[2]	—	(1)	(1)	—	1	1	—
	II	50[2]	(50)[2]	—	50	(50)	—	10	(10)	—
	III	125[2]	(125)[2]	—	125	(125)	—	25	(25)	—
	IV	500	(500)	—	500	(500)	—	100	(100)	—
	V	N.L.	N.L.	—	N.L.	N.L.	—	N.L.	N.L.	—
4.3 Oxidizer	4	1[2]	(1)[2]	—	1/4[2]	(1/4)	—	1/4	(1/4)	—
	3	10[2]	(10)[2]	—	2	(2)	—	2	(2)	—
	2	250[2]	(250)[2]	—	50	(250)	—	50	(50)	—
	1	1,000[2]	(1,000)[2]	—	1,000	(1,000)	—	200	(200)	—
4.4 Oxidizer, Gas (gaseous) (liquefied)		— —	— 15[2]	1,500[2] —	— —	— 15[2]	1,500[2] —	— —	— —	— —
5.1 Pyrophoric		4[2]	(4)[2]	50[2]	1	(1)	10[2]	0	0	0
6.1 Unstable (reactive)	4	1[2]	(1)[2]	10[2]	1/4	(1/4)	2[2]	1/4	(1/4)	0
	3	5[2]	(5)[2]	50[2]	1	(1)	10[2]	1	(1)	0
	2	50[2]	(50)[2]	250[2]	50	(50)	250[2]	10	(10)	0
	1	125[2]	125[2]	750[2]	125	(125)	750[2]	25	(25)	0
7.1 Water (reactive)	3	5[2]	(5)[2]	—	5	(5)	—	1	(1)	—
	2	50[2]	(50)[2]	—	50	(50)	—	10	(10)	—
	1	125[2]	(125)[2]	—	125	(125)[2]	—	25	(25)	—

1. *A laboratory suite is a space up to 10,000 square feet (929 m^2) bounded by not less than a one-hour fire-resistive occupancy separation within which the exempt amounts of hazardous materials may be stored, dispensed, handled or used. Up through the third floor and down through the first basement floor, the quantity in this table shall apply. Fourth, fifth and sixth floors and the second and third basement floor level quantity shall be reduced to 75 percent of this table. The seventh through 10th floor and below the third basement floor level quantity shall be reduced to 50 percent of this table.*
2. *Quantities may be increased 100 percent when stored in approved exhausted gas cabinets, exhausted enclosures or fume hoods.*

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TABLE 1116.7(2)–EXEMPT AMOUNTS OF HAZARDOUS MATERIALS, LIQUIDS AND CHEMICALS PRESENTING A HEALTH HAZARD MAXIMUM QUANTITIES PER LABORATORY SUITE[1]
When two units are given, values within parentheses are in pounds (lbs.)

MATERIAL	STORAGE			USE CLOSED SYSTEMS			USE OPEN SYSTEMS	
	Solid lb	Liquid Gallons (lb)	Gas (cu. ft)	Solid lb	Liquid Gallons (lb)	Gas (cu. ft)	Solid lb	Liquid Gallons (lb)
1. Corrosives	5,000	500	650[2]	5,000	500	650	1,000	100
2a. Highly toxics[2]	40	10	65	5	1	65	2	1/4
2b. Toxics	500	50	650[2]	500	50	650	5	1/2
3. Irritants	5,000	500	650	5,000	500	650	1,000	100
4. Sensitizers	5,000	500	650	5,000	500	650	1,000	100
5. Other health hazards	5,000	500	650	5,000	500	650	1,000	100

1. A laboratory suite is a space up to 10,000 square feet (929 m^2) bounded by not less than a one-hour fire-resistive occupancy separation within which the exempt amounts of hazardous materials may be stored, dispensed, handled or used. Up through the third floor and down through the first basement floor, the quantity in this table shall apply. Fourth, fifth and sixth floors and the second and third basement floor level quantity shall be reduced to 75 percent of this table. The seventh through 10th floor and below the third basement floor level quantity shall be reduced to 50 percent of this table.
2. Permitted only when stored or used in approved exhausted gas cabinets, exhausted enclosures or fume hoods. Quantities of high toxics in use in open systems need not be reduced above the third floor or below the first basement floor level. Individual container size shall be limited to 2 pounds (0.91 kg) for solids and 1/4 gallon (0.95 L) for liquids.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 12 – ENERGY SYSTEMS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
1203.1.2			X																				
1203.1.3.1			X																				
1203.1.5.1			X																				
1203.2.11			X																				
1205.2.4			X																				
1205.3.4			X																				
1207.11.3			X																				
1207.11.4			X																				
Table 1207.11.4			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

12 ENERGY SYSTEMS

User notes:

About this chapter: Chapter 12 was added to address the current energy systems found in this code, and is provided for the introduction of a wide range of systems to generate and store energy in, on and adjacent to buildings and facilities. The expansion of such energy systems is related to meeting today's energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders. More specifically, this chapter addresses standby and emergency power, portable generators, photovoltaic systems, fuel cell energy systems and energy storage systems.

SECTION 1201—GENERAL

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation, maintenance, repair, retrofitting, testing, commissioning and decommissioning of energy systems used for generating or storing energy, including but not limited to energy storage systems under the exclusive control of an electric utility or lawfully designated agency. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency. Energy storage systems regulated by Section 1207 shall comply with this chapter, as appropriate, and NFPA 855.

1201.2 Electrical wiring and equipment. Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with this chapter, Section 603 and *the California Electrical Code.*

1201.3 Mixed system installation. Where mixed systems are approved, the aggregate nameplate kWh energy of all energy storage systems in a fire area shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the fire code official, a hazard mitigation analysis shall be provided and approved in accordance with Section 104.2.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

SECTION 1202—DEFINITIONS

1202.1 Definitions. The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY STORAGE.

BATTERY TYPES.

CAPACITOR ENERGY STORAGE SYSTEM.

CRITICAL CIRCUIT.

EMERGENCY POWER SYSTEM.

ENERGY STORAGE MANAGEMENT SYSTEMS.

ENERGY STORAGE SYSTEM (ESS).

ENERGY STORAGE SYSTEM, ELECTROCHEMICAL.

ENERGY STORAGE SYSTEM, MOBILE.

ENERGY STORAGE SYSTEM, WALK-IN UNIT.

ENERGY STORAGE SYSTEM CABINET.

ENERGY STORAGE SYSTEM COMMISSIONING.

ENERGY STORAGE SYSTEM DECOMMISSIONING.

FUEL CELL POWER SYSTEM, STATIONARY.

PORTABLE GENERATOR.

STANDBY POWER SYSTEM.

SECTION 1203—EMERGENCY AND STANDBY POWER SYSTEMS

1203.1 General. Emergency power systems and standby power systems required by this code or the *California Building Code* shall comply with Sections 1203.1.1 through 1203.1.9.

1203.1.1 Stationary generators. Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200.

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1203.1.2 Fuel line piping protection. Fuel lines supplying a generator set inside a high-rise building *or new Group I-2 occupancy having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* shall be separated from areas of the building other than the room the generator is located in by one of the following methods:

1. A fire-resistant pipe-protection system that has been tested in accordance with UL 1489. The system shall be installed as tested and in accordance with the manufacturer's installation instructions, and shall have a rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required rating shall be reduced to 1 hour.
2. An assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.
3. Other approved methods.

1203.1.3 Installation. Emergency power systems and standby power systems shall be installed in accordance with the *California Building Code, the California Electrical Code,* NFPA 110 and NFPA 111.

1203.1.3.1 Combustion engines and gas turbines. *The installation of combustion engines and gas turbines shall be in accordance with California Building Code Section 442 and NFPA 37.*

1203.1.4 Load transfer. Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

1203.1.5 Load duration. Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.

1203.1.5.1 High-rise buildings and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest floor level having building access. *Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 6 hours without being refueled or recharged. The minimum required fuel supply shall be maintained at all times.*

1203.1.6 Uninterruptable power source. An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.

1203.1.7 Interchangeability. Emergency power systems shall be an acceptable alternative for installations that require standby power systems.

1203.1.8 Group I-2 occupancies. In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the *California Building Code* where new essential electrical systems are installed, and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

1203.1.9 Maintenance. Existing installations shall be maintained in accordance with the original approval and Section 1203.4.

1203.2 Where required. Emergency and standby power systems shall be provided where required by Sections 1203.2.1 through 1203.2.19.

1203.2.1 Ambulatory care facilities. Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the *California Building Code*.

1203.2.2 Elevators and platform lifts. Standby power shall be provided for elevators and platform lifts as required in Sections 604.3, 1009.4.1 and 1009.5.

1203.2.3 Emergency responder communication coverage systems. Standby power shall be provided for in-building, two-way emergency responder communication coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the in-building, two-way emergency responder communication coverage system at 100-percent system operation capacity for a duration of not less than 12 hours.

1203.2.4 Emergency voice/alarm communication systems. Standby power shall be provided for emergency voice/alarm communication systems in accordance with NFPA 72.

1203.2.5 Exhaust ventilation. Standby power shall be provided for mechanical exhaust ventilation systems as required in Section 1207.6.1.2.1. The system shall be capable of powering the required load for a duration of not less than 2 hours.

1203.2.6 Exit signs. Emergency power shall be provided for exit signs as required in Section 1013.6.3. The system shall be capable of powering the required load for a duration of not less than 90 minutes.

1203.2.7 Gas detection systems. Emergency power shall be provided for gas detection systems where required by Sections 1203.2.10 and 1203.2.17. Standby power shall be provided for gas detection systems where required by Sections 916.5 and 1207.6.1.2.4.

1203.2.8 Group I-2 occupancies. Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 407.11 of the *California Building Code*.

1203.2.9 Group I-3 occupancies. Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks.

Exceptions:

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the *California Building Code*.
2. Emergency power is not required where remote mechanical operating releases are provided.

1203.2.10 Hazardous materials. Emergency and standby power shall be provided in occupancies with hazardous materials as required in the following sections:

1. Sections 5004.7 and 5005.1.5 for hazardous materials.
2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases.
3. Section 6204.1.11 for organic peroxides.

1203.2.11 High-rise buildings *and Group I-2 occupancies having occupied floors more than 75 feet above the lowest level of fire department vehicle access*. Standby power and emergency power shall be provided for high-rise buildings *and Group I-2 occupancies having occupied floors located more than 75 feet above the lowest level of fire department vehicle access* as required in Section 403 of the *California Building Code*, and shall be in accordance with Section 1203.

1203.2.12 Special purpose horizontal sliding doors. Standby power shall be provided for horizontal sliding doors as required in Section 1010.3.3. The standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.

1203.2.13 Hydrogen fuel gas rooms. Standby power shall be provided for hydrogen fuel gas rooms as required by Section 5808.7.

1203.2.14 Laboratory suites. Standby or emergency power shall be provided in accordance with Section 5004.7 where laboratory suites are located above the sixth story above grade plane or located in a story below grade plane.

1203.2.15 Means of egress illumination. Emergency power shall be provided for means of egress illumination in accordance with Sections 1008.2.4 and 1104.5.1.

1203.2.16 Membrane structures. Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with Section 2702 of the *California Building Code*. Auxiliary inflation systems shall be provided in temporary air-supported and air-inflated membrane structures in accordance with Section 3103.9.4.

1203.2.17 Semiconductor fabrication facilities. Emergency power shall be provided for semiconductor fabrication facilities as required in Section 2703.15.

1203.2.18 Smoke control systems. Standby power shall be provided for smoke control systems as required in Section 909.11.

1203.2.19 Underground buildings. Emergency and standby power shall be provided in underground buildings as required in Section 405 of the *California Building Code* and shall be in accordance with Section 1203.

1203.3 Critical circuits. Required critical circuits shall be protected using one of the following methods:

1. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196 and shall have a fire-resistance rating of not less than 1 hour.
2. Electrical circuit protective systems shall have a fire-resistance rating of not less than 1 hour. Electrical circuit protective systems shall be installed in accordance with their listing requirements.
3. Construction having a fire-resistance rating of not less than 1 hour.

1203.4 Maintenance. Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

1203.4.1 Group I-2 and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, emergency and standby power systems shall be maintained in accordance with NFPA 99.

1203.4.2 Schedule. Inspection, testing and maintenance of emergency and standby power systems shall be in accordance with an approved schedule established upon completion and approval of the system installation.

1203.4.3 Records. Records of the inspection, testing and maintenance of emergency and standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be maintained.

1203.4.4 Switch maintenance. Emergency and standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by Section 1203.4.2. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer's instructions.

1203.5 Operational inspection and testing. Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

Exception: Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

1203.5.1 Group I-2 and ambulatory care facilities. In Group I-2 occupancies and ambulatory care facilities, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99.

1203.5.2 Transfer switch test. The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position.

1203.6 Supervision of maintenance and testing. Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

SECTION 1204—PORTABLE GENERATORS

1204.1 Portable generators. The use, operation and maintenance of portable generators shall comply with this section.

1204.2 Listing. Portable generators manufactured after January 1, 2021, shall be listed and labeled in accordance with UL 2201.

1204.3 Operation and maintenance. Portable generators shall be operated and maintained in accordance with the manufacturer's instructions.

1204.4 Grounding. Portable generators shall be grounded in accordance with *the California Electrical Code.*

1204.5 Operating locations. Portable generators shall be operated only outdoors a minimum of 5 feet (1524 mm) from any building openings such as windows and doors or air intakes. Portable generators shall not be operated within buildings or enclosed areas. Additional separation shall be provided for tents, membrane structures and outdoor assembly events as specified in Chapter 31.

1204.6 Cords and wiring. Extension cords and temporary wiring used to connect portable generators shall be in accordance with Section 603 and shall be provided with GFCI protection.

1204.7 Connections to premise wiring. Connections to a premise wiring system shall comply with all of the following:

1. Power shall not be provided in a manner that "back-feeds" receptacles or the premise wiring system.
2. Connection to a premise served by commercial power shall be made through a listed transfer switch installed, used and maintained in accordance with *the California Electrical Code*.
3. Connections to buildings not served by commercial power shall comply with *the California Electrical Code*.

1204.8 Refueling. Portable generators shall not be refueled while operating.

1204.9 Storage and repair. Storage and repair of fuel-fired portable generators shall comply with Section 313.

1204.10 Fire extinguisher. A listed portable fire extinguisher complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided not more than 50 feet (15 240 mm) from the portable generator.

SECTION 1205—SOLAR PHOTOVOLTAIC POWER SYSTEMS

1205.1 General. Solar photovoltaic (PV) systems shall be installed in accordance with the *California Building Code* or *California Residential Code*. The electrical portion of solar PV systems shall be installed in accordance with *the California Electrical Code*. Rooftop-mounted solar photovoltaic systems shall be installed in accordance with Sections 1205.2 through 1205.4.3. Ground-mounted solar photovoltaic systems shall comply with Section 1205.5.

1205.2 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Sections 1205.2.1 through 1205.3.3. Pathways shall be over areas capable of supporting firefighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

Exceptions:

1. Detached, nonhabitable Group U structures including, but not limited to, detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where the fire code official has determined that rooftop operations will not be employed.
3. Building-integrated photovoltaic (BIPV) systems where the BIPV systems are approved, integrated into the finished roof surface and are listed in accordance with UL 3741. The removal or cutting away of portions of the BIPV system during firefighting operations shall not expose a firefighter to electrical shock hazards.

1205.2.1 Solar photovoltaic (PV) systems for Group R-3 buildings. Solar photovoltaic (PV) systems for Group R-3 buildings shall comply with Sections 1205.2.1.1 through 1205.2.3.

Exceptions:

1. These requirements shall not apply to structures designed and constructed in accordance with the *California Residential Code*.
2. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (16.7-percent slope) or less.

1205.2.1.1 Pathways to ridge. Not fewer than two 36-inch-wide (914 mm) pathways on separate roof planes, from lowest roof edge to ridge, shall be provided on all buildings. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, not fewer than one 36-inch-wide (914 mm) pathway from lowest roof edge to ridge shall be provided on the same roof plane as the photovoltaic array, on an adjacent roof plane or straddling the same and adjacent roof planes.

1205.2.1.2 Setbacks at ridge. For photovoltaic arrays occupying 33 percent or less of the plan view total roof area, a setback of not less than 18 inches (457 mm) wide is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, a setback of not less than 36 inches (457 mm) wide is required on both sides of a horizontal ridge.

1205.2.1.3 Alternative setbacks at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with Section 903.3.1.3, setbacks at the ridge shall conform to one of the following:

1. For photovoltaic arrays occupying 66 percent or less of the plan view total roof area, a setback of not less than 18 inches (457 mm) wide is required on both sides of a horizontal ridge.
2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, a setback of not less than 36 inches (914 mm) wide is required on both sides of a horizontal ridge.

1205.2.2 Emergency escape and rescue openings. Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

1205.2.3 Building-integrated photovoltaic (BIPV) systems. Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location approved by the fire code official.

Exception: BIPV systems listed in accordance with UL 3741, where the removal or cutting away of portions of the BIPV system during firefighting operations have been determined to not expose a firefighter to electrical shock hazards.

1205.2.4 Locations of DC conductors. *Conduit, wiring systems and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. DC wiring shall be installed in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members.*

1205.3 Other than Group R-3 buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1205.3.1 through 1205.3.3.

Exception: Where it is determined by the fire code official that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1205.2.1.1 through 1205.2.1.3 are a suitable alternative.

1205.3.1 Perimeter pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

1205.3.2 Interior pathways. Interior pathways shall be provided between array sections to meet the following requirements:

1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.
3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with not fewer than one such pathway to a parapet or roof edge.

1205.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on not fewer than one side.
3. Smoke ventilation options between array sections shall be one of the following:
    3.1. A pathway not less than 8 feet (2438 mm) wide.
    3.2. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.

1205.3.4 Locations of DC conductors in occupancies other than R-3. *Conduit, wiring systems and raceways for photovoltaic circuits shall be located as close as possible to the ridge or hip or valley and from the hip or valley as directly as possible to an outside wall to reduce trip hazards and maximize ventilation opportunities. Conduit runs between sub arrays and to DC combiner boxes shall be installed in a manner that minimizes the total amount of conduit on the roof by taking the shortest path from the array to the DC combiner box. The DC combiner boxes shall be located such that conduit runs are minimized in the pathways between arrays. DC wiring shall be installed in metallic conduit or raceways when located within enclosed spaces in a building. Conduit shall run along the bottom of load bearing members.*

1205.4 Buildings with rapid shutdown. Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with Sections 1205.4.1 through 1205.4.3.

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1205.4.1 Rapid shutdown type. The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of $^3/_8$ inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of $^3/_{16}$ inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1205.4.1(1) and state the following:

   SOLAR PV SYSTEM EQUIPPED WITH
   RAPID SHUTDOWN. TURN RAPID
   SHUTDOWN SWITCH TO THE "OFF"
   POSITION TO SHUT DOWN PV SYSTEM
   AND REDUCE SHOCK HAZARD IN ARRAY.

2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of $^3/_8$ inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of $^3/_{16}$ inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1205.4.1(2) and state the following:

   THIS SOLAR PV SYSTEM EQUIPPED
   WITH RAPID SHUTDOWN. TURN RAPID
   SHUTDOWN SWITCH TO THE "OFF"
   POSITION TO SHUT DOWN CONDUCTORS
   OUTSIDE THE ARRAY. CONDUCTORS
   WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT.

FIGURE 1205.4.1(1)—LABEL FOR SOLAR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUT DOWN CONDUCTORS LEAVING ARRAY

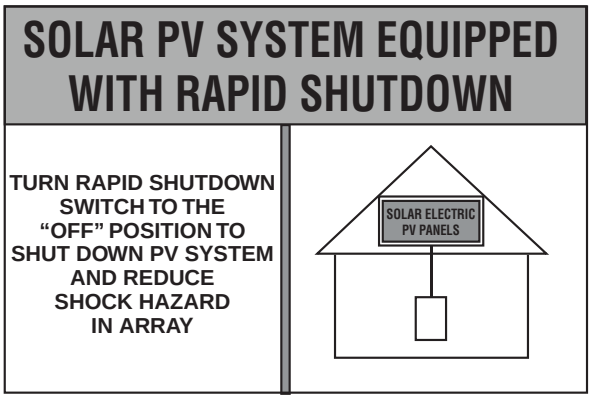
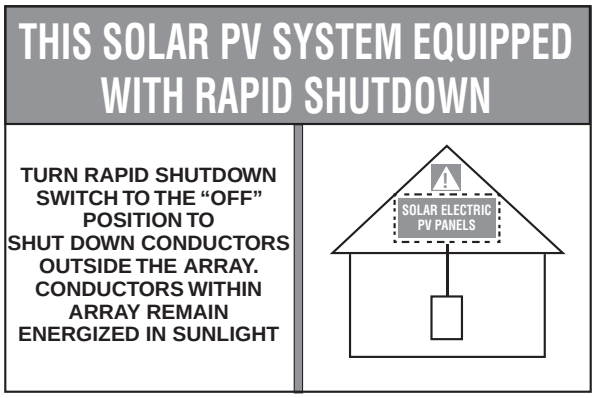

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY
SOLAR ELECTRIC PV PANELS

FIGURE 1205.4.1(2)—LABEL FOR SOLAR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY


THIS SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT
SOLAR ELECTRIC PV PANELS

1205.4.1.1 Diagram. The labels in Section 1205.4.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the solar photovoltaic system that are not shut down when the rapid shutdown switch is turned off.

1205.4.1.2 Location. The rapid shutdown label in Section 1205.4.1 shall be located not greater than 3 feet (914 mm) from the service disconnecting means to which the photovoltaic systems are connected, and shall indicate the location of all identified rapid shutdown switches if not at the same location.

1205.4.2 Buildings with more than one rapid shutdown type. Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1205.4.1 or solar photovoltaic systems where only portions of the systems on the

building contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

1205.4.3 Rapid shutdown switch. A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following:

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

1205.5 Ground-mounted photovoltaic panel systems. Ground-mounted photovoltaic panel systems shall be installed in accordance with this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays.

1205.5.1 Vegetation control. A clear, brush-free area of 10 feet (3048 mm) shall be required around the perimeter of the ground-mounted photovoltaic arrays. A maintained vegetative surface or a noncombustible base, approved by the fire code official, shall be installed and maintained under the photovoltaic arrays and associated electrical equipment installations.

SECTION 1206—STATIONARY FUEL CELL POWER SYSTEMS

1206.1 General. Stationary fuel cell power systems in new and existing occupancies shall comply with this section.

Exception: The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section 1206.13.

1206.2 Permits. Permits shall be obtained for stationary fuel cell power systems as set forth in Section 105.6.10.

1206.3 Equipment. Stationary fuel cell power systems shall comply with the following:

1. Prepackaged fuel cell power systems shall be listed and labeled in accordance with CSA FC 1.
2. The modules and components in a preengineered fuel cell power system shall be listed and labeled in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer's instructions and the module and component listings.
3. Field-fabricated fuel cell power systems shall be approved based on a review of the technical report provided in accordance with Section 104.2.2. The report shall be prepared by and bear the stamp of a registered design professional and shall include:
    3.1. A fire risk evaluation.
    3.2. An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.
    3.3. Documentation of the fuel cell power system's compliance with applicable NFPA 2 and NFPA 853 construction requirements.

1206.4 Installation. Stationary fuel cell power systems shall be installed and maintained in accordance with *the California Electrical Code* and NFPA 853, the manufacturer's installation instructions, and the listing. Stationary fuel cell power systems fueled by hydrogen shall be installed and maintained in accordance with NFPA 2 and *the California Electrical Code*, the manufacturer's installation instructions and the listing.

1206.5 Residential use. Stationary fuel cell power systems shall not be installed in Group R-3 and R-4 buildings, or dwelling units associated with Group R-2 buildings unless they are specifically listed for residential use.

Exception: The temporary use of a fuel cell-powered electric vehicle to power a Group R-3 or R-4 building while parked shall comply with Section 1206.13.

1206.6 Indoor installations. Stationary fuel cell power systems installed in indoor locations shall comply with Sections 1206.6 through 1206.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

1206.6.1 Listed. Stationary fuel cell power systems installed indoors shall be specifically listed and labeled for indoor use.

1206.6.2 Separation. Rooms containing stationary fuel cell power systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the *California Building Code*.

1. Group B, F, M, S and U occupancies by 1-hour fire-resistance-rated construction.
2. Group A, E, I and R occupancies by 2-hour fire-resistance-rated construction.

Exception: Stationary fuel cell power systems with an aggregate rating less than 50 kW shall not be required to be separated from other occupancies provided that the systems comply with Section 9.3 of NFPA 853.

1206.6.3 Gas detection systems. Stationary fuel cell power systems shall be provided with a gas detection system. Detection shall be provided in approved locations in the fuel cell power system enclosure, the exhaust system or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL).

1206.6.3.1 System activation. The activation of the gas detection system shall automatically:

1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in approved locations.

1206.7 Vehicle impact protection. Where stationary fuel cell power systems are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

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1206.8 Outdoor installation. Stationary fuel cell power systems located outdoors shall be separated by not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Any portion of a designated means of egress system.
8. Other exposure hazards.

1206.9 Fuel supply. The design, location and installation of the fuel supply for stationary fuel cell power systems shall comply with Chapter 53, Chapter 58 and the *International Fuel Gas Code*, based on the particular fuel being supplied to the system.

1206.10 Manual shutoff. Access to a manual shutoff valve shall be provided for the fuel piping within 6 feet (1829 mm) of any fuel storage tank serving the fuel cell and within 6 feet (1829 mm) of the power system. If the fuel tank and the stationary fuel cell power system are less than 12 feet (3658 mm) apart, a single shutoff valve shall be permitted. If the stationary fuel cell power system is located indoors, the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise approved by the fire code official.

1206.11 Ventilation and exhaust. Ventilation and exhaust for stationary fuel cell power systems shall be provided in accordance with NFPA 853.

1206.12 Fire protection. Fire protection systems for stationary fuel cell power system installations shall be provided in accordance with NFPA 853.

1206.13 Group R-3 and R-4 fuel cell vehicle energy storage system use. The temporary use of the dwelling unit owner or occupant's fuel cell-powered electric vehicle to power a Group R-3 or R-4 dwelling while parked in an attached or detached garage or outside shall comply with the vehicle manufacturer's instructions and *the California Electrical Code*.

SECTION 1207—ELECTRICAL ENERGY STORAGE SYSTEMS (ESS)

1207.1 General. The provisions in this section are applicable to stationary and mobile electrical energy storage systems (ESS).

Exception: ESS in Group R-3 and R-4 occupancies shall only be required to comply with Section 1207.11 except where Section 1207.11.4 requires compliance with Sections 1207.1 through 1207.9.

1207.1.1 Utilities and industrial applications. This section shall not apply to capacitors and capacitor equipment for electric utilities and industrial facilities used in applications such as flexible AC transmission (FACTS) devices, filter capacitor banks, power factor correction, and standalone capacitor banks for voltage correction and stabilization. (Material based on NFPA 855 2023 Ed.)

1207.1.2 Mobile ESS. Mobile ESS deployed at an electric utility substation or generation facility for 90 days or less shall not add to the threshold values in Table 1207.1.3 for the stationary ESS installation if both of the following conditions apply:

1. The mobile ESS complies with Section 1207.10.
2. The mobile ESS is being used only during periods in which the facility's stationary ESS is being tested, repaired, retrofitted or replaced.

(Material based on NFPA 855 2023 Ed.)

1207.1.3 Scope. ESS having capacities exceeding the values shown in Table 1207.1.3 shall comply with this section. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.1.3—ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES

TECHNOLOGY	ENERGY CAPACITY[a]
Capacitor ESS	3 kWh
Flow batteries[b]	20 kWh
Lead-acid batteries, all types	70 kWh[c]
Lithium-ion batteries	20 kWh
Nickel-cadmium (Ni-Cd), nickel metal hydride (Ni-MH) and nickel zinc (Ni-Zn) batteries	70 kWh
Nonelectrochemical ESS[d]	70 kWh
Other battery technologies	10 kWh
Other electrochemical ESS technologies	3 kWh
Sodium nickel chloride batteries	70 kWh
Zinc manganese dioxide batteries (Zn-MnO_2)	70 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating. For units rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1,000.
b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.
c. Fifty gallons of lead-acid battery electrolyte shall be considered equivalent to 70 kWh.
d. Covers nonelectrochemical technologies such as flywheel and thermal ESS.

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1207.1.4 Permits. Permits shall be obtained for ESS as follows:

1. Construction permits shall be obtained for stationary ESS installations and for mobile ESS charging and storage installations covered by Section 1207.10.1. Permits shall be obtained in accordance with Section 105.6.6.
2. Operational permits shall be obtained for stationary ESS installations and for mobile ESS deployment operations covered by Section 1207.10.3. Permits shall be obtained in accordance with Section 105.5.14.

1207.1.4.1 Communication utilities. Operational permits shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 voltage alternating current (VAC) and 60 voltage direct current (VDC).

1207.1.5 Construction documents. The following information shall be provided with the permit application:

1. Location and layout diagram of the room or area in which the ESS is to be installed.
2. Details on the hourly fire-resistance ratings of assemblies enclosing the ESS.
3. The quantities and types of ESS to be installed.
4. Manufacturer's specifications, ratings and listings of each ESS.
5. Description of energy (battery) management systems and their operation.
6. Location and content of required signage.
7. Details on fire suppression, smoke or fire detection, thermal management, ventilation, exhaust and deflagration venting systems, if provided.
8. Support arrangement associated with the installation, including any required seismic restraint.
9. A commissioning plan complying with Section 1207.2.1.
10. A decommissioning plan complying with Section 1207.2.3.
11. A fire safety and evacuation plan in accordance with Section 404.

1207.1.5.1 Utilities applicability. Plans and specifications associated with ESS owned and operated by electric utilities as a component of the electric grid that are considered critical infrastructure documents in accordance with the provisions of the North American Electric Reliability Corporation and other applicable governmental laws and regulations shall be made available to the fire code official for viewing based on the requirements of the applicable governmental laws and regulations. (Material based on NFPA 855 2023 Ed.)

1207.1.6 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.2.2 under any of the following conditions:

1. Where ESS technologies not specifically identified in Table 1207.1.3 are provided.
2. More than one ESS technology is provided in a single fire area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities. See Section 1207.5.2.
4. Where required by the fire code official to address a potential hazard with an ESS installation that is not addressed by existing requirements.

1207.1.6.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes. Only single failure modes shall be considered.

1. A thermal runaway condition in a single electrochemical ESS unit.
2. A mechanical failure of a nonelectrochemical ESS unit.
3. Failure of any battery (energy) management system or fire protection system within the ESS equipment that is not covered by the product listing failure mode effects analysis (FMEA).
4. Failure of any required protection system external to the ESS, including but not limited to ventilation (HVAC), exhaust ventilation, smoke detection, fire detection, gas detection or fire suppression system. (Material based on NFPA 855 2023 Ed.)

1207.1.6.2 Analysis approval. The fire code official is authorized to approve the hazardous mitigation analysis provided that the consequences of the hazard mitigation analysis demonstrate:

1. Fires will be contained within unoccupied ESS rooms or areas for the minimum duration of the fire-resistance-rated separations identified in Section 1207.7.4.
2. Fires involving the ESS will allow occupants or the general public to evacuate to a safe location. (Material based on NFPA 855 2023 Ed.)

1207.1.6.3 Additional protection measures. Construction, equipment and systems that are required for the ESS to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1207, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

1207.1.7 Large-scale fire test. Where required elsewhere in Section 1207, large-scale fire testing shall be conducted on a representative ESS in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory and show that a fire involving one ESS will not propagate to an adjacent ESS, and where installed within buildings, enclosed areas and walk-in units will be contained within the room, enclosed area or walk-in unit for the duration of the test. The test report shall be provided to the fire code official for review and approval in accordance with Section 104.2.2. (Material based on NFPA 855 2023 Ed.)

1207.1.8 Fire remediation. Where a fire or other event has damaged the ESS and ignition or re-ignition of the ESS is possible, the system owner, agent or lessee shall take the following actions, at their expense, to mitigate the hazard or remove damaged equipment from the premises to a safe location.

1207.1.8.1 Fire mitigation personnel. Where, in the opinion of the fire code official, it is essential for public safety that trained personnel be on-site to respond to possible ignition or re-ignition of a damaged ESS, the system owner, agent or lessee shall dispatch within 15 minutes one or more fire mitigation personnel to the premise, as required and approved, at their expense. These personnel shall remain on duty continuously after the fire department leaves the premise until the damaged energy storage equipment is removed from the premises, or earlier if the fire code official indicates the public safety hazard has been abated. (Material based on NFPA 855 2023 Ed.)

1207.1.8.2 Duties. On-duty fire mitigation personnel shall have the following responsibilities:

1. Keep a diligent watch for fires, obstructions to means of egress and other hazards.
2. Immediately contact the fire department if their assistance is needed to mitigate any hazards or extinguish fires.
3. Take prompt measures for remediation of hazards in accordance with the decommissioning plan per Section 1207.2.3.
4. Take prompt measures to assist in the evacuation of the public from the structures. (Material based on NFPA 855 2023 Ed.)

1207.2 Commissioning, decommissioning, operation and maintenance. Commissioning, decommissioning, operation and maintenance shall be conducted in accordance with this section.

1207.2.1 Commissioning. Commissioning of newly installed ESS and existing ESS that have been retrofitted, replaced or previously decommissioned and are returning to service shall be conducted prior to the ESS being placed in service in accordance with a commissioning plan that has been approved prior to initiating commissioning. The commissioning plan shall include the following:

1. A narrative description of the activities that will be accomplished during each phase of commissioning, including the personnel intended to accomplish each of the activities.
2. A listing of the specific ESS and associated components, controls and safety-related devices to be tested, a description of the tests to be performed and the functions to be tested.
3. Conditions under which all testing will be performed, which are representative of the conditions during normal operation of the system.
4. Documentation of the owner's project requirements and the basis of design necessary to understand the installation and operation of the ESS.
5. Verification that required equipment and systems are installed in accordance with the approved plans and specifications.
6. Integrated testing for all fire and safety systems.
7. Testing for any required thermal management, ventilation or exhaust systems associated with the ESS installation.
8. Preparation and delivery of operation and maintenance documentation.
9. Training of facility operating and maintenance staff.
10. Identification and documentation of the requirements for maintaining system performance to meet the original design intent during the operation phase.
11. Identification and documentation of personnel who are qualified to service, maintain and decommission the ESS, and respond to incidents involving the ESS, including documentation that such service has been contracted for./p>
12. A decommissioning plan for removing the ESS from service, and from the facility in which it is located. The plan shall include details on providing a safe, orderly shutdown of energy storage and safety systems with notification to the code officials prior to the actual decommissioning of the system. The decommissioning plan shall include contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event.

Exceptions:

1. Commissioning shall not be required for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC. A decommissioning plan shall be provided and maintained where required by the fire code official.
2. Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC that are in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities, and are located outdoors or in building spaces or walk-in units used exclusively for such installations that are in compliance with NFPA 76, shall be permitted to have a commissioning plan in compliance with recognized industry practices in lieu of complying with Section 1207.2.1.
3. Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utilities, and are located in building spaces or walk-in units used exclusively for such installations, shall be permitted to have a commissioning plan in compliance with applicable governmental laws and regulations in lieu of developing a commissioning plan in accordance with Section 1207.2.1. (Material based on NFPA 855 2023 Ed.)

1207.2.1.1 Initial acceptance testing. During the commissioning process an ESS shall be evaluated for proper operation in accordance with the manufacturer's instructions and the commissioning plan prior to final approval.

1207.2.1.2 Commissioning report. A report describing the results of the system commissioning, including the results of the initial acceptance testing required in Section 1207.2.1.1, shall be provided to the fire code official prior to final inspection and approval and maintained at an approved on-site location. (Material based on NFPA 855 2023 Ed.)

1207.2.2 Operation and maintenance. An operation and maintenance manual shall be provided to both the ESS owner or their authorized agent and the ESS operator before the ESS is put into operation and shall include the following:

1. Manufacturer's operation manuals and maintenance manuals for the entire ESS, or for each component of the system requiring maintenance, that clearly identify the required routine maintenance actions.
2. Name, address and phone number of a service agency that has been contracted to service the ESS and its associated safety systems.
3. Maintenance and calibration information, including wiring diagrams, control drawings, schematics, system programming instructions and control sequence descriptions, for all energy storage control systems.
4. Desired or field-determined control set points that are permanently recorded on control drawings at control devices or, for digital control systems, in system programming instructions.
5. A schedule for inspecting and recalibrating all ESS controls.
6. A service record log form that lists the schedule for all required servicing and maintenance actions and space for logging such actions that are completed over time and retained on-site.

The ESS shall be operated and maintained in accordance with the manual and a copy of the manual shall be retained at an approved on-site location.

1207.2.2.1 Ongoing inspection and testing. Systems that monitor and protect the ESS installation shall be inspected and tested in accordance with the manufacturer's instructions and the operation and maintenance manual. Inspection and testing records shall be maintained in the operation and maintenance manual.

1207.2.3 Decommissioning. The code official shall be notified prior to the decommissioning of an ESS. Decommissioning shall be performed in accordance with the decommissioning plan that includes the following:

1. A narrative description of the activities to be accomplished for removing the ESS from service, and from the facility in which it is located.
2. A listing of any contingencies for removing an intact operational ESS from service, and for removing an ESS from service that has been damaged by a fire or other event. (Material based on NFPA 855 2023 Ed.)

1207.3 Equipment. ESS equipment shall be in accordance with Sections 1207.3.1 through 1207.3.9.

1207.3.1 Energy storage system listings. ESS shall be listed in accordance with UL 9540.

Exceptions:

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunications facilities for installations of communications equipment under the exclusive control of communications utilities located outdoors or in building spaces used exclusively for such installations that are in compliance with NFPA 76.
2. Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778 and utilized for standby power applications.

(Material based on NFPA 855 2023 Ed.)

1207.3.2 Equipment listing. Chargers, inverters and energy storage management systems shall be covered as part of the UL 9540 listing or shall be listed separately.

1207.3.3 Utility interactive systems. Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.

1207.3.4 Energy storage management system. Where required by the ESS listing, an approved energy storage management system that monitors and balances cell voltages, currents and temperatures within the manufacturer's specifications shall be provided. The system shall disconnect electrical connections to the ESS or otherwise place it in a safe condition if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected. (Material based on NFPA 855 2023 Ed.)

1207.3.5 Enclosures. Enclosures of ESS shall be of noncombustible construction. (Material based on NFPA 855 2023 Ed.)

1207.3.6 Repairs. Repairs of ESS shall only be done by qualified personnel. Repairs with other than identical parts shall be considered retrofitting and comply with Section 1207.3.7. Repairs shall be documented in the service records log. (Material based on NFPA 855 2023 Ed.)

1207.3.7 Retrofits. Retrofitting of an existing ESS shall comply with the following:

1. A construction permit shall be obtained in accordance with Section 105.6.6.
2. New batteries, battery modules, capacitors and similar ESS components shall be listed.
3. Battery management and other monitoring systems shall be connected and installed in accordance with the manufacturer's instructions.

4. The overall installation shall continue to comply with UL 9540 listing requirements, where applicable.
5. Systems that have been retrofitted shall be commissioned in accordance with Section 1207.2.1.
6. Retrofits shall be documented in the service records log. (Material based on NFPA 855 2023 Ed.)

1207.3.7.1 Retrofitting lead acid and nickel cadmium. Changing out or retrofitting of lead-acid and nickel-cadmium batteries with other lead-acid and nickel-cadmium batteries in the following applications shall be considered repairs where there is no increase in system size or energy capacity greater than 10 percent of the original design.

1. At facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
2. Battery systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Batteries in uninterruptible power supplies listed and labeled in accordance with UL 1778 and used for standby power applications only.

(Material based on NFPA 855 2023 Ed.)

1207.3.8 Replacements. Replacements of ESS shall be considered new ESS installations and shall comply with the provisions of Section 1207 as applicable to new ESS. The ESS being replaced shall be decommissioned in accordance with Section 1207.2.3. (Material based on NFPA 855 2023 Ed.)

1207.3.9 Reused and repurposed equipment. Equipment and materials shall only be reused or reinstalled as permitted in Section 104.9.1. Storage batteries previously used in other applications, such as electric vehicle propulsion, shall not be reused in applications regulated by Chapter 12 unless approved by the fire code official and unless the equipment is refurbished by a battery refurbishing company approved in accordance with UL 1974. (Material based on NFPA 855 2023 Ed.)

1207.4 General installations requirements. Stationary and mobile ESS shall comply with the requirements of Sections 1207.4.1 through 1207.4.12.

1207.4.1 Electrical disconnects. Where the ESS disconnecting means is not within sight of the main electrical service disconnecting means, placards or directories shall be installed at the location of the main electrical service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with *the California Electrical Code*.

Exception: Electrical disconnects for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC shall be permitted to have electrical disconnects signage in accordance with NFPA 76.

1207.4.2 Working clearances. Access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment in accordance with *the California Electrical Code* and the manufacturer's instructions.

1207.4.3 Fire-resistance-rated separations. Rooms and other indoor areas containing ESS shall be separated from other areas of the building in accordance with Section 1207.7.4. ESS shall be permitted to be in the same room with the equipment they support.

1207.4.4 Seismic and structural design. Stationary ESS shall comply with the seismic design requirements in Chapter 16 of the *California Building Code*, and shall not exceed the floor loading limitation of the building.

1207.4.5 Vehicle impact protection. Where ESS are subject to impact by a motor vehicle, including forklifts, vehicle impact protection shall be provided in accordance with Section 312.

1207.4.6 Combustible storage. Combustible materials shall not be stored in ESS rooms, areas or walk-in units. Combustible materials in occupied work centers covered by Section 1207.4.10 shall be stored at least 3 feet (914 mm) from ESS cabinets.

1207.4.7 Toxic and highly toxic gases. ESS that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall be provided with a hazardous exhaust system in accordance with *Chapter 5* of the *California Mechanical Code*.

1207.4.8 Signage. Approved signs shall be provided on or adjacent to all entry doors for ESS rooms or areas and on enclosures of ESS cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and *the California Electrical Code* shall be permitted. The signage shall include the following or equivalent:

1. "ENERGY STORAGE SYSTEM," "BATTERY STORAGE SYSTEM," "CAPACITOR ENERGY STORAGE SYSTEM" or the equivalent.
2. The identification of the electrochemical ESS technology present.
3. "ENERGIZED ELECTRICAL CIRCUITS."
4. Where water-reactive electrochemical ESS are present, the signage shall include "APPLY NO WATER."
5. Current contact information, including phone number, for personnel authorized to service the equipment and for fire mitigation personnel required by Section 1207.1.8.1.

Exception: Existing electrochemical ESS shall be permitted to include the signage required at the time they were installed. (Material based on NFPA 855 2023 Ed.)

1207.4.9 Security of installations. Rooms, areas and walk-in units in which electrochemical ESS are located shall be secured against unauthorized entry and safeguarded in an approved manner. Security barriers, fences, landscaping and other enclosures

shall not inhibit the required air flow to or exhaust from the electrochemical ESS and its components. (Material based on NFPA 855 2023 Ed.)

1207.4.10 Occupied work centers. Electrochemical ESS located in rooms or areas occupied by personnel not directly involved with maintenance, service and testing of the systems shall comply with the following:

1. Electrochemical ESS located in occupied work centers shall be housed in locked noncombustible cabinets or other enclosures to prevent access by unauthorized personnel.
2. Where electrochemical ESS are contained in cabinets in occupied work centers, the cabinets shall be located within 10 feet (3048 mm) of the equipment that they support.
3. Cabinets shall include signage complying with Section 1207.4.8. (Material based on NFPA 855 2023 Ed.)

1207.4.11 Open rack installations. Where electrochemical ESS are installed in a separate equipment room and only authorized personnel have access to the room, they shall be permitted to be installed on an open rack for ease of maintenance. (Material based on NFPA 855 2023 Ed.)

1207.4.12 Walk-in units. Walk-in units shall be entered only for inspection, maintenance and repair of ESS units and ancillary equipment, and shall not be occupied for other purposes.

1207.5 Electrochemical ESS protection. The protection of electrochemical ESS shall be in accordance with Sections 1207.5.1 through 1207.5.8 where required by Sections 1207.7 through 1207.10. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.5—MAXIMUM ALLOWABLE QUANTITIES OF ELECTROCHEMICAL ESS

TECHNOLOGY	MAXIMUM ALLOWABLE QUANTITIES [a]
STORAGE BATTERIES	
Flow batteries[b]	600 kWh
Lead-acid, all types	Unlimited
Lithium-ion	600 kWh
Nickel-cadmium (Ni-Cd), nickel-metal hydride (NI-MH) and nickel zinc (Ni-Zn)	Unlimited
Sodium nickel chloride	600 kWh
Zinc-manganese dioxide (Zn-MnO_2)	Unlimited
Other battery technologies	200 kWh
CAPACITORS	
All types	20 kWh
OTHER ELECTROCHEMICAL ESS	
All types	20 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

a. For electrochemical ESS units rated in amp-hours, kWh shall equal rated voltage times the amp-hour rating divided by 1,000.

b. Shall include vanadium, zinc-bromine, polysulfide-bromide and other flowing electrolyte-type technologies.

1207.5.1 Size and separation. Electrochemical ESS shall be segregated into groups not exceeding 50 kWh (180 megajoules). Each group shall be separated a minimum of 3 feet (914 mm) from other groups and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions: (Material based on NFPA 855 2023 Ed.)

1. Lead-acid and nickel-cadmium battery systems in facilities under the exclusive control of communications utilities and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.
2. Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shut-down of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, and limited to not more than 10 percent of the floor area on the floor on which the ESS is located.
4. The fire code official is authorized to approve larger capacities or smaller separation distances based on large-scale fire testing complying with Section 1207.1.5.

1207.5.2 Maximum allowable quantities. Fire areas within rooms, areas and walk-in units containing electrochemical ESS shall not exceed the maximum allowable quantities in Table 1207.5.

Exceptions: (Material based on NFPA 855 2023 Ed.)

1. Where approved by the fire code official, rooms, areas and walk-in units containing electrochemical ESS that exceed the amounts in Table 1207.5 shall be permitted based on a hazardous mitigation analysis in accordance with Section 1207.1.6 and large-scale fire testing complying with Section 1207.1.7.
2. Lead-acid and nickel-cadmium battery systems installed in facilities under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76.

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3. Dedicated-use buildings in compliance with Section 1207.7.1.

1207.5.2.1 Mixed electrochemical energy systems. Where rooms, areas and walk-in units contain different types of electrochemical energy technologies, the total aggregate quantities of the systems shall be determined based on the sum of percentages of each technology-type quantity divided by the maximum allowable quantity of each technology type. The sum of the percentages shall not exceed 100 percent of the maximum allowable quantity.

1207.5.3 Elevation. Electrochemical ESS shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access.
2. Where the floor is located below the lowest level of exit discharge.

Exceptions: (Material based on NFPA 855 2023 Ed.)

1. Lead-acid and nickel-cadmium battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located.
4. Where approved, installations shall be permitted in underground vaults complying with *the California Electrical Code*, Article 450, Part III.
5. Where approved by the fire code official, installations shall be permitted on higher and lower floors.

1207.5.4 Fire detection. An approved automatic smoke detection system or radiant energy-sensing fire detection system complying with Section 907.2 shall be installed in rooms, indoor areas and walk-in units containing electrochemical ESS. An approved radiant energy-sensing fire detection system shall be installed to protect open parking garage and rooftop installations. Alarm signals from detection systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or where approved to a constantly attended location.

Exception: Normally unoccupied, remote stand-alone telecommunications structures with a gross floor area of less than 1,500 square feet (139 m^2) utilizing lead-acid or nickel-cadmium batteries shall not be required to have a fire detection system installed. (Material based on NFPA 855 2023 Ed.)

1207.5.4.1 System status. Lead-acid and nickel-cadmium battery systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations, shall be allowed to use the process control system to monitor the smoke or radiant energy-sensing fire detectors required in Section 1207.5.4. (Material based on NFPA 855 2023 Ed.)

1207.5.5 Fire suppression systems. Rooms and areas within buildings and walk-in units containing electrochemical ESS shall be protected by an automatic fire suppression system designed and installed in accordance with one of the following:

1. Automatic sprinkler systems designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) with a maximum stored energy capacity of 50 kWh, as described in Section 1207.5.1, shall be designed with a minimum density of 0.3 gpm/ft^2 (1.14 L/min) based over the area of the room or 2,500 square-foot (232 m^2) design area, whichever is smaller, unless a lower density is approved based on large-scale fire testing in accordance with Section 1207.1.7.
2. Automatic sprinkler systems designed and installed in accordance with Section 903.3.1.1 for ESS units (groups) exceeding 50 kWh shall use a density based on large-scale fire testing complying with Section 1207.1.7.
3. The following alternative automatic fire-extinguishing systems designed and installed in accordance with Section 904, provided that the installation is approved by the fire code official based on large-scale fire testing complying with Section 1207.1.7:
    3.1. NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*.
    3.2. NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*.
    3.3. NFPA 750, *Standard on Water Mist Fire Protection Systems*.
    3.4. NFPA 2001, *Standard on Clean Agent Fire-Extinguishing Systems*.
    3.5. NFPA 2010, *Standard for Fixed Aerosol Fire-Extinguishing Systems*.

Exceptions:

1. Fire suppression systems for lead-acid and nickel-cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.
2. Lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations, shall not be required to have a fire suppression system installed.
3. Lead-acid battery systems in uninterruptable power supplies listed and labeled in accordance with UL 1778, utilized for standby power applications, which is limited to not more than 10 percent of the floor area on the floor on which the ESS is located, shall not be required to have a fire suppression system. (Material based on NFPA 855 2023 Ed.)

1207.5.5.1 Water-reactive systems. Electrochemical ESS that utilize water-reactive materials shall be protected by an approved alternative automatic fire-extinguishing system in accordance with Section 904, where the installation is approved by the fire code official based on large-scale fire testing complying with Section 1207.1.7.

1207.5.6 Maximum enclosure size. Outdoor walk-in units housing ESS shall not exceed 53 feet by 8 feet by 9.5 feet high (16 154 mm × 2438 mm × 2896 mm), not including bolt-on HVAC and related equipment, as approved. Outdoor walk-in units exceeding these limitations shall be considered indoor installations and comply with the requirements in Section 1207.7. (Material based on NFPA 855 2023 Ed.)

1207.5.7 Vegetation control. Areas within 10 feet (3048 mm) on each side of outdoor ESS shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery or cultivated ground cover such as green grass, ivy, succulents or similar plants used as ground cover shall be permitted to be exempt provided that they do not form a means of readily transmitting fire. (Material based on NFPA 855 2023 Ed.)

1207.5.8 Means of egress separation. ESS located outdoors and in open parking garages shall be separated from any means of egress as required by the fire code official to ensure safe egress under fire conditions, but in no case less than 10 feet (3048 mm).

Exception: The fire code official is authorized to approve a reduced separation distance if large-scale fire testing complying with Section 1207.1.7 is provided that shows that a fire involving the ESS will not adversely impact occupant egress. (Material based on NFPA 855 2023 Ed.)

1207.6 Electrochemical ESS technology-specific protection. Electrochemical ESS installations shall comply with the requirements of this section in accordance with the applicable requirements of Table 1207.6. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.6—ELECTROCHEMICAL ESS TECHNOLOGY-SPECIFIC REQUIREMENTS

COMPLIANCE REQUIRED[b]		BATTERY TECHNOLOGY							
Feature	Section	Lead-acid	Nickel cadmium (Ni-Cd), nickel-metal hydride (Ni-MH) and nickel zinc (Ni-Zn)	Zinc-manganese dioxide ($Zn-MnO_2$)	Lithium-ion	Flow	Sodium nickel chloride	OTHER ESS AND BATTERY TECHNOLOGIES[b]	CAPACITOR ESS[b]
Exhaust ventilation	1207.6.1	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Explosion control	1207.6.3	Yes[a]	Yes[a]	Yes	Yes	No	Yes	Yes	Yes
Safety caps	1207.6.4	Yes	Yes	No	No	No	No	Yes	Yes
Spill control and neutralization	1207.6.2	Yes[c]	Yes[c]	Yes[f]	No	Yes	No	Yes	Yes
Thermal runaway	1207.6.5	Yes[d]	Yes	Yes[e]	Yes[e]	No	Yes	Yes[e]	Yes

a. Not required for lead-acid and nickel-cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
b. Protection shall be provided unless documentation acceptable to the fire code official is provided in accordance with Section 104.2.2 that provides justification why the protection is not necessary based on the technology used.
c. Applicable to vented-type (i.e., flooded) nickel-cadmium and lead-acid batteries.
d. Not required for vented-type (i.e., flooded) batteries.
e. The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery as part of the evaluation to UL 1973.
f. Not required for batteries with jelled electrolyte.

1207.6.1 Exhaust ventilation. Where required by Table 1207.6 or elsewhere in this code, exhaust ventilation of rooms, areas and walk-in units containing electrochemical ESS shall be provided in accordance with the *California Mechanical Code* and Section 1207.6.1.1 or 1207.6.1.2.

1207.6.1.1 Ventilation based on LFL. The exhaust ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammable limit (LFL) of the total volume of the room, area or walk-in unit during the worst-case event of simultaneous charging of batteries at the maximum charge rate, in accordance with nationally recognized standards.

1207.6.1.2 Ventilation based on exhaust rate. Mechanical exhaust ventilation shall be provided at a rate of not less than 1 $ft^3/min/ft^2$ (5.1 $L/sec/m^2$) of floor area of the room, area or walk-in unit. The ventilation shall be either continuous or shall be activated by a gas detection system in accordance with Section 1207.6.1.2.4.

1207.6.1.2.1 Standby power. Mechanical exhaust ventilation shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.

1207.6.1.2.2 Installation instructions. Required mechanical exhaust ventilation systems shall be installed in accordance with the manufacturer's installation instructions and the *California Mechanical Code*.

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1207.6.1.2.3 Supervision. Required mechanical exhaust ventilation systems shall be supervised by an approved central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible signal at an approved constantly attended on-site location.

1207.6.1.2.4 Gas detection system. Where required by Section 1207.6.1.2, rooms, areas and walk-in units containing ESS shall be protected by an approved continuous gas detection system that complies with Section 916 and with the following:

1. The gas detection system shall be designed to activate the mechanical ventilation system when the level of flammable gas in the room, area or walk-in unit exceeds 25 percent of the LFL.
2. The mechanical ventilation system shall remain on until the flammable gas detected is less than 25 percent of the LFL.
3. The gas detection system shall be provided with a minimum of 2 hours of standby power in accordance with Section 1203.2.5.
4. Failure of the gas detection system shall annunciate a trouble signal at an approved central station, proprietary or remote station service in accordance with NFPA 72, or shall initiate an audible and visible trouble signal at an approved constantly attended on-site location. (Material based on NFPA 855 2023 Ed.)

1207.6.2 Spill control and neutralization. Where required by Table 1207.6 or elsewhere in this code, areas containing free-flowing liquid electrolyte or hazardous materials shall be provided with spill control and neutralization in accordance with this section. (Material based on NFPA 855 2023 Ed.)

1207.6.2.1 Spill control. Spill control shall be provided to prevent the flow of liquid electrolyte or hazardous materials to adjoining rooms or areas. The method shall be capable of containing a spill from the single largest battery or vessel. (Material based on NFPA 855 2023 Ed.)

1207.6.2.2 Neutralization. An approved method that is capable of neutralizing spilled liquid electrolyte from the largest battery or vessel to a pH between 5.0 and 9.0 shall be provided. (Material based on NFPA 855 2023 Ed.)

1207.6.2.3 Communications utilities. The requirements of Section 1207.6.2 shall apply only when the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L) for lead-acid and nickel-cadmium battery systems operating at less than 50 VAC and 60 VDC that are located at facilities under the exclusive control of communications utilities, and those facilities comply with NFPA 76 in addition to applicable requirements of this code.

1207.6.3 Explosion control. Where required by Table 1207.6 or elsewhere in this code, explosion control complying with Section 911 shall be provided for rooms, areas, ESS cabinets or ESS walk-in units containing electrochemical ESS technologies.

Exceptions: (Material based on NFPA 855 2023 Ed.)

1. Where approved, explosion control is permitted to be waived by the fire code official based on large-scale fire testing complying with Section 1207.1.7 that demonstrates that flammable gases are not liberated from electrochemical ESS cells or modules.
2. Where approved, explosion control is permitted to be waived by the fire code official based on documentation provided in accordance with Section 104.2.2 that demonstrates that the electrochemical ESS technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the LFL anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.
3. Where approved, ESS cabinets that have no debris, shrapnel or enclosure pieces ejected during large-scale fire testing complying with Section 1207.1.5 shall be permitted in lieu of providing explosion control complying with Section 911.
4. Explosion control is not required for lead-acid and nickel-cadmium battery systems less than 50 VAC, 60 VDC in telecommunication facilities under the exclusive control of communications utilities located in building spaces or walk-in units used exclusively for such installations.
5. Explosion control is not required for lead-acid and nickel-cadmium systems used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, located in building spaces or walk-in units used exclusively for such installations.
6. Explosion control is not required for lead-acid battery systems in uninterruptable power supplies *listed* and *labeled* in accordance with UL 1778, utilized for standby power applications, and housed in a single cabinet in a single *fire area* in buildings or walk-in units.

1207.6.4 Safety caps. Where required by Table 1207.6 or elsewhere in this code, vented batteries and other ESS shall be provided with flame-arresting safety caps.

1207.6.5 Thermal runaway. Where required by Table 1207.6 or elsewhere in this code, batteries and other ESS shall be provided with a listed device or other approved method to prevent, detect and minimize the impact of thermal runaway.

1207.7 Indoor installations. Indoor ESS installations shall be in accordance with Sections 1207.7.1 through 1207.7.4. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.7—INDOOR ESS INSTALLATIONS			
COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS[a]	NONDEDICATED-USE BUILDINGS[b]
Feature	Section		
Dwelling units and sleeping units	1207.7.3	NA	Yes
COMPLIANCE REQUIRED		DEDICATED-USE BUILDINGS[a]	NONDEDICATED-USE BUILDINGS[b]
Feature	Section		
Elevation	1207.5.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes
Fire-resistance-rated separations	1207.7.4	Yes	Yes
General installation requirements	1207.4	Yes	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection[e]	1207.5.4	Yes[d]	Yes
Technology specific protection	1207.6	Yes	Yes

NA = Not Allowed.

a. See Section 1207.7.1.

b. See Section 1207.7.2.

c. Where approved by the fire code official, fire suppression systems are permitted to be omitted in dedicated-use buildings located more than 100 feet (30.5 m) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards.

d. Where approved by the fire code official, alarm signals are not required to be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, or a constantly attended location where local fire alarm annunciation is provided and trained personnel are always present.

e. Lead-acid and nickel-cadmium battery systems installed in Group U buildings and structures less than 1,500 square feet (139 m^2) under the exclusive control of communications utilities, and operating at less than 50 VAC and 60 VDC in accordance with NFPA 76, are not required to have an approved automatic smoke or fire detection system.

1207.7.1 Dedicated-use buildings. For the purpose of Table 1207.7, dedicated-use ESS buildings shall be classified as Group F-1 occupancies and comply with all the following:

1. The building shall only be used for ESS, electrical energy generation and other electrical grid-related operations.
2. Occupants in the rooms and areas containing ESS are limited to personnel that operate, maintain, service, test and repair the ESS and other energy systems.
3. No other occupancy types shall be permitted in the building.
4. Administrative and support personnel shall be permitted in areas within the buildings that do not contain ESS, provided that:
   - 4.1. The areas do not occupy more than 10 percent of the building area of the story in which they are located.
   - 4.2. A means of egress is provided from the incidental use areas to the public way that does not require occupants to traverse through areas containing ESS or other energy system equipment. (Material based on NFPA 855 2023 Ed.)

1207.7.2 Nondedicated-use buildings. For the purpose of Table 1207.7, nondedicated-use buildings include all buildings that contain ESS and do not comply with Section 1207.7.1 dedicated-use building requirements. (Material based on NFPA 855 2023 Ed.)

1207.7.3 Dwelling units and sleeping units. ESS shall not be installed in sleeping units or in habitable spaces of dwelling units. (Material based on NFPA 855 2023 Ed.)

1207.7.4 Fire-resistance-rated separations. Rooms and areas containing ESS shall include fire-resistance-rated separations as follows:

1. In dedicated-use buildings, rooms and areas containing ESS shall be separated from areas in which administrative and support personnel are located.
2. In nondedicated-use buildings, rooms and areas containing ESS shall be separated from other areas in the building.

Separation shall be provided by 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* and 2-hour horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, as appropriate. (Material based on NFPA 855 2023 Ed.)

1207.8 Outdoor installations. Outdoor installations shall be in accordance with Sections 1207.8.1 through 1207.8.3. Exterior wall installations for individual ESS units not exceeding 20 kWh shall be in accordance with Section 1207.8.4. (Material based on NFPA 855 2023 Ed.)

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TABLE 1207.8—OUTDOOR ESS INSTALLATIONS[a]			
COMPLIANCE REQUIRED		REMOTE INSTALLATIONS[a]	INSTALLATIONS NEAR EXPOSURES[b]
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.8.3	Yes	Yes
Fire suppression systems	1207.5.5	Yes[c]	Yes
Maximum allowable quantities	1207.5.2	No	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Size and separation	1207.5.1	No	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes
Vegetation control	1207.5.7	Yes	Yes

a. See Section 1207.8.1.
b. See Section 1207.8.2.
c. Where approved by the fire code official, fire suppression systems are permitted to be omitted.
d. In outdoor walk-in units, spacing is not required between ESS units and the walls of the enclosure.

1207.8.1 Remote outdoor installations. For the purpose of Table 1207.8, remote outdoor installations include ESS located more than 100 feet (30 480 mm) from buildings, lot lines, public ways, stored combustible materials, hazardous materials, high-piled stock and other exposure hazards. (Material based on NFPA 855 2023 Ed.)

1207.8.2 Installations near exposures. For the purpose of Table 1207.8, installations near exposures include all outdoor ESS installations that do not comply with Section 1207.8.1 remote outdoor location requirements. (Material based on NFPA 855 2023 Ed.)

1207.8.3 Clearance to exposures. ESS located outdoors shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

Exceptions: (Material based on NFPA 855 2023 Ed.)

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing fire barrier suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.
2. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where noncombustible exterior walls with no openings or combustible overhangs are provided on the wall adjacent to the ESS and the fire-resistance rating of the exterior wall is a minimum of 2 hours.
3. Clearances to buildings are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section 1207.1.7.

1207.8.4 Exterior wall installations. ESS shall be permitted to be installed outdoors on exterior walls of buildings when all of the following conditions are met:

1. The maximum energy capacity of individual ESS units shall not exceed 20 kWh.
2. The ESS shall comply with applicable requirements in Section 1207.
3. The ESS shall be installed in accordance with the manufacturer's instructions and their listing.
4. Individual ESS units shall be separated from each other by at least 3 feet (914 mm).
5. The ESS shall be separated from doors, windows, operable openings into buildings or HVAC inlets by at least 5 feet (1524 mm).

Exception: Where approved, smaller separation distances in Items 4 and 5 shall be permitted based on large-scale fire testing complying with Section 1207.1.7. (Material based on NFPA 855 2023 Ed.)

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1207.9 Special installations. Rooftop and open parking garage ESS installations shall comply with Sections 1207.9.1 through 1207.9.6.

TABLE 1207.9—SPECIAL ESS INSTALLATIONS			
COMPLIANCE REQUIRED		ROOFTOPS[a]	OPEN PARKING GARAGES[b]
Feature	Section		
All ESS installations	1207.4	Yes	Yes
Clearance to exposures	1207.9.3	Yes	Yes
Fire suppression systems	1207.9.4	Yes	Yes
Maximum allowable quantities	1207.5.2	Yes	Yes
Maximum enclosure size	1207.5.6	Yes	Yes
Means of egress separation	1207.5.8	Yes	Yes
Open parking garage installations	1207.9.6	No	Yes
Rooftop installations	1207.9.5	Yes	No
Size and separation	1207.5.1	Yes	Yes
Smoke and automatic fire detection	1207.5.4	Yes	Yes
Technology-specific protection	1207.6	Yes	Yes

a. See Section 1207.9.1.
b. See Section 1207.9.2.

1207.9.1 Rooftop installations. For the purpose of Table 1207.9, rooftop ESS installations are those located on the roofs of buildings. (Material based on NFPA 855 2023 Ed.)

1207.9.2 Open parking garage installations. For the purpose of Table 1207.9, open parking garage ESS installations are those located in a structure or portion of a structure that complies with Section 406.5 of the *California Building Code*. (Material based on NFPA 855 2023 Ed.)

1207.9.3 Clearance to exposures. ESS located on rooftops and in open parking garages shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop ESS is mounted.
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed.
3. Lot lines.
4. Public ways.
5. Stored combustible materials.
6. Locations where motor vehicles can be parked.
7. Hazardous materials.
8. Other exposure hazards.

Exceptions:

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour free-standing fire barrier suitable for exterior use and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the ESS installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the ESS, and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure based on large-scale fire testing complying with Section 1207.1.7. (Material based on NFPA 855 2023 Ed.)

1207.9.4 Fire suppression systems. ESS located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the ESS enclosure in accordance with Section 1207.5.5. Areas containing ESS other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1207.5.5.

Exception: A fire suppression system is not required in open parking garages if large-scale fire testing complying with Section 1207.1.7 is provided that shows that a fire will not impact the exposures in Section 1207.9.3. (Material based on NFPA 855 2023 Ed.)

1207.9.5 Rooftop installations. ESS and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways at least 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.

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3. ESS and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from an ESS or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.
6. The ESS shall be the minimum of 10 feet (3048 mm) from the fire service access point on the rooftop. (Material based on NFPA 855 2023 Ed.)

1207.9.6 Open parking garages. ESS and associated equipment that are located in open parking garages shall comply with all of the following:

1. ESS shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.

   Exception: This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.
2. ESS shall not be located within 25 feet (7620 mm) of exits leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
3. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of the ESS. (Material based on NFPA 855 2023 Ed.)

1207.10 Mobile ESS equipment and operations. Mobile ESS equipment and operations shall comply with Sections 1207.10.1 through 1207.10.7.7. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.10—MOBILE ENERGY STORAGE SYSTEMS (ESS)

COMPLIANCE REQUIRED		DEPLOYMENT[a]
Feature	**Section**	
All ESS installations	1207.4	Yes[b]
Fire suppression systems	1207.5.5	Yes[c]
Maximum allowable quantities	1207.5.2	Yes
Maximum enclosure size	1207.5.6	Yes
Means of egress separation	1207.5.8	Yes
Size and separation	1207.5.1	Yes[d]
Smoke and automatic fire detection	1207.5.4	Yes[e]
Technology-specific protection	1207.6	Yes
Vegetation control	1207.5.7	Yes

a. See Section 1207.10.2.
b. Mobile operations on wheeled vehicles and trailers shall not be required to comply with Section 1207.4.4 seismic and structural load requirements.
c. Fire suppression system connections to the water supply shall be permitted to use approved temporary connections.
d. In walk-in units, spacing is not required between ESS units and the walls of the enclosure.
e. Alarm signals are not required to be transmitted to an approved location for mobile ESS deployed 30 days or less.

1207.10.1 Charging and storage. For the purpose of Section 1207.10, charging and storage covers the operation where mobile ESS are charged and stored so they are ready for deployment to another site, and where they are charged and stored after a deployment.

Exception: Mobile ESS used to temporarily provide power to lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations. (Material based on NFPA 855 2023 Ed.)

1207.10.2 Deployment. For the purpose of Section 1207.10, deployment covers operations where mobile ESS are located at a site other than the charging and storage site and are being used to provide power.

Exception: Mobile ESS used to temporarily provide power to lead-acid and nickel-cadmium systems that are used for DC power for control of substations and control or safe shutdown of generating stations under the exclusive control of the electric utility, and located outdoors or in building spaces used exclusively for such installations. (Material based on NFPA 855 2023 Ed.)

1207.10.3 Permits. Construction and operational permits shall be provided for charging and storage of mobile ESS and operational permits shall be provided for deployment of mobile ESS as required by Section 1207.1.4.

1207.10.4 Construction documents. Construction documents complying with Section 1207.1.5 shall be provided with the construction permit application for mobile ESS charging and storage locations.

1207.10.4.1 Deployment documents. The following information shall be provided with the operation permit applications for mobile ESS deployments:

1. Relevant information for the mobile ESS equipment and protection measures in the construction documents required by Section 1207.1.5.

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2. Location and layout diagram of the area in which the mobile ESS is to be deployed, including a scale diagram of all nearby exposures.
3. Location and content of signage, including no smoking signs.
4. Description of fencing to be provided around the ESS, including locking methods.
5. Details on fire suppression, smoke and automatic fire detection, system monitoring, thermal management, exhaust ventilation and explosion control, if provided.
6. For deployment, the intended duration of operation, including anticipated connection and disconnection times and dates.
7. Location and description of local staging stops during transit to the deployment site. See Section 1207.10.7.5.
8. Description of the temporary wiring, including connection methods, conductor type and size, and circuit overcurrent protection to be provided.
9. Description of how fire suppression system connections to water supplies or extinguishing agents are to be provided.
10. Contact information for personnel who are responsible for maintaining and servicing the equipment, and responding to emergencies as required by Section 1207.1.8.1. (Material based on NFPA 855 2023 Ed.)

1207.10.5 Approved locations. Locations where mobile ESS are charged, stored and deployed shall be restricted to the locations established on the construction and operational permits. (Material based on NFPA 855 2023 Ed.)

1207.10.6 Charging and storage. Installations where mobile ESS are charged and stored shall be treated as permanent ESS indoor or outdoor installations, and shall comply with the following sections, as applicable:

1. Indoor charging and storage shall comply with Section 1207.7.
2. Outdoor charging and storage shall comply with Section 1207.8.
3. Charging and storage on rooftops and in open parking garages shall comply with Section 1207.9.

Exceptions:

1. Electrical connections shall be permitted to be made using temporary wiring complying with the manufacturer's instructions, the UL 9540 listing and *the California Electrical Code*.
2. Fire suppression system connections to the water supply shall be permitted to use approved temporary connections. (Material based on NFPA 855 2023 Ed.)

1207.10.7 Deployed mobile ESS requirements. Deployed mobile ESS equipment and operations shall comply with this section and Table 1207.10. (Material based on NFPA 855 2023 Ed.)

1207.10.7.1 Duration. The duration of mobile ESS deployment shall not exceed 30 days.

Exceptions:

1. Mobile ESS deployments that provide power for durations longer than 30 days shall comply with Section 1207.10.6.
2. Mobile ESS deployments shall not exceed 180 days unless additional operational permits are obtained. (Material based on NFPA 855 2023 Ed.)

1207.10.7.2 Restricted locations. Deployed mobile ESS operations shall not be located indoors, in covered parking garages, on rooftops, below grade or under building overhangs. (Material based on NFPA 855 2023 Ed.)

1207.10.7.3 Clearance to exposures. Deployed mobile ESS shall be separated by a minimum of 10 feet (3048 mm) from the following exposures:

1. Public ways.
2. Buildings.
3. Stored combustible materials.
4. Hazardous materials.
5. High-piled storage.
6. Other exposure hazards.

Deployed mobile ESS shall be separated by a minimum of 50 feet (15 240 mm) from public seating areas and from tents, canopies and membrane structures with an occupant load of 30 or more. (Material based on NFPA 855 2023 Ed.)

1207.10.7.4 Electrical connections. Electrical connections shall be made in accordance with the manufacturer's instructions and the UL 9540 listing. Temporary wiring for electrical power connections shall comply with *the California Electrical Code*. Fixed electrical wiring shall not be provided. (Material based on NFPA 855 2023 Ed.)

1207.10.7.5 Local staging. Mobile ESS in transit from the charging and storage location to the deployment location and back shall not be parked within 100 feet (30 480 mm) of an occupied building for more than 1 hour during transit, unless specifically approved by the fire code official when the permit is issued. (Material based on NFPA 855 2023 Ed.)

1207.10.7.6 Fencing. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public at least 5 feet (1524 mm) from the outer enclosure of a deployed mobile ESS. (Material based on NFPA 855 2023 Ed.)

1207.10.7.7 Smoking. Smoking shall be prohibited within 10 feet (3048 mm) of mobile ESS. Signs shall be posted in accordance with Section 310.

1207.11 ESS in Group R-3 and R-4 occupancies. ESS in Group R-3 and R-4 occupancies shall be in accordance with Sections 1207.11.1 through 1207.11.9.

Exceptions:

1. ESS listed and labeled in accordance with UL 9540 and marked "For use in residential dwelling units," where installed in accordance with the manufacturer's instructions and *the California Electrical Code*.
2. ESS rated less than 1 kWh (3.6 megajoules).

1207.11.1 Equipment listings. ESS shall be listed and labeled in accordance with UL 9540.

1207.11.2 Installation. ESS shall be installed in accordance with the manufacturer's instructions and their listing. (Material based on NFPA 855 2023 Ed.)

1207.11.2.1 Spacing. Individual ESS units shall be separated from each other by at least 3 feet (914 mm) except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.7.

1207.11.3 Location. ESS shall be installed only in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space in accordance with Section *R302.6.*
3. Outdoors or on the exterior side of exterior walls located *not less than* 3 feet (914 mm) from doors and windows directly entering the dwelling unit.
4. Enclosed utility closets, basements, and storage or utility spaces within dwelling units and sleeping units with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^{5}/_{8}$-inch *(15.9 mm)* Type X gypsum wallboard.

ESS shall not be installed in sleeping rooms, or in closets or spaces opening directly into sleeping rooms. (Material based on NFPA 855 2023 Ed.)

1207.11.4 Energy ratings. Individual ESS units shall have a maximum rating of 20 kWh. The *ratings* of the ESS *in each location* shall not exceed *the ratings in Table 1207.11.4. The total aggregate ratings of ESS on the property shall not exceed 600 kWh.*

1. 40 kWh within utility closets, basements, and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached accessory structures.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Sections 1207.1 through 1207.9. (Material based on NFPA 855 2023 Ed.)

TABLE 1207.11.4—MAXIMUM AGGREGATE RATINGS OF ESS

LOCATION	*MAXIMUM AGGREGATE RATINGS (kWh)*	*INSTALLATION REQUIREMENTS*
Within utility closets, basements, and storage or utility spaces located within dwellings	*40*	
In attached garages	*80*	
On or within 3 feet of exterior walls of dwellings and attached garages	*100*	
On or within 3 feet of exterior walls of dwellings and attached garages	*200*	*Exterior walls and eaves are constructed with noncombustible surfaces.[a]*
In detached garages and detached accessory structures	*200*	
In detached garages and detached accessory structures	*600*	*Detached garage or detached accessory structure is a minimum 10 feet away from property lines and dwellings.*
Outdoors on the ground	*200*	*ESS is a minimum 3 feet away from property lines and dwellings.*
Outdoors on the ground	*600*	*ESS is a minimum 10 feet away from property lines and dwellings.*

For SI: 1 foot = 304.8 mm

a. Noncombustible wall surface shall extend in accordance with all the following:

1. *A minimum of 5 feet horizontally from the edge of the ESS.*
2. *A minimum of 1 foot vertically below the bottom edge of the ESS.*
3. *A minimum of 8 feet vertically above the ESS, or to a noncombustible eave, whichever is less.*

The code official is authorized to approve reductions of installation requirements based on large-scale fire testing complying with Section 1207.1.5.

1207.11.5 Electrical installation. ESS shall be installed in accordance with *the California Electrical Code.* Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction. (Material based on NFPA 855 2023 Ed.)

1207.11.6 Fire detection. ESS installed in Group R-3 and R-4 occupancies shall comply with the following:

1. Rooms and areas within dwelling units, sleeping units, basements and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section 907.2.11.
2. A listed heat alarm shall be installed in locations where smoke alarms cannot be installed based on their listing.

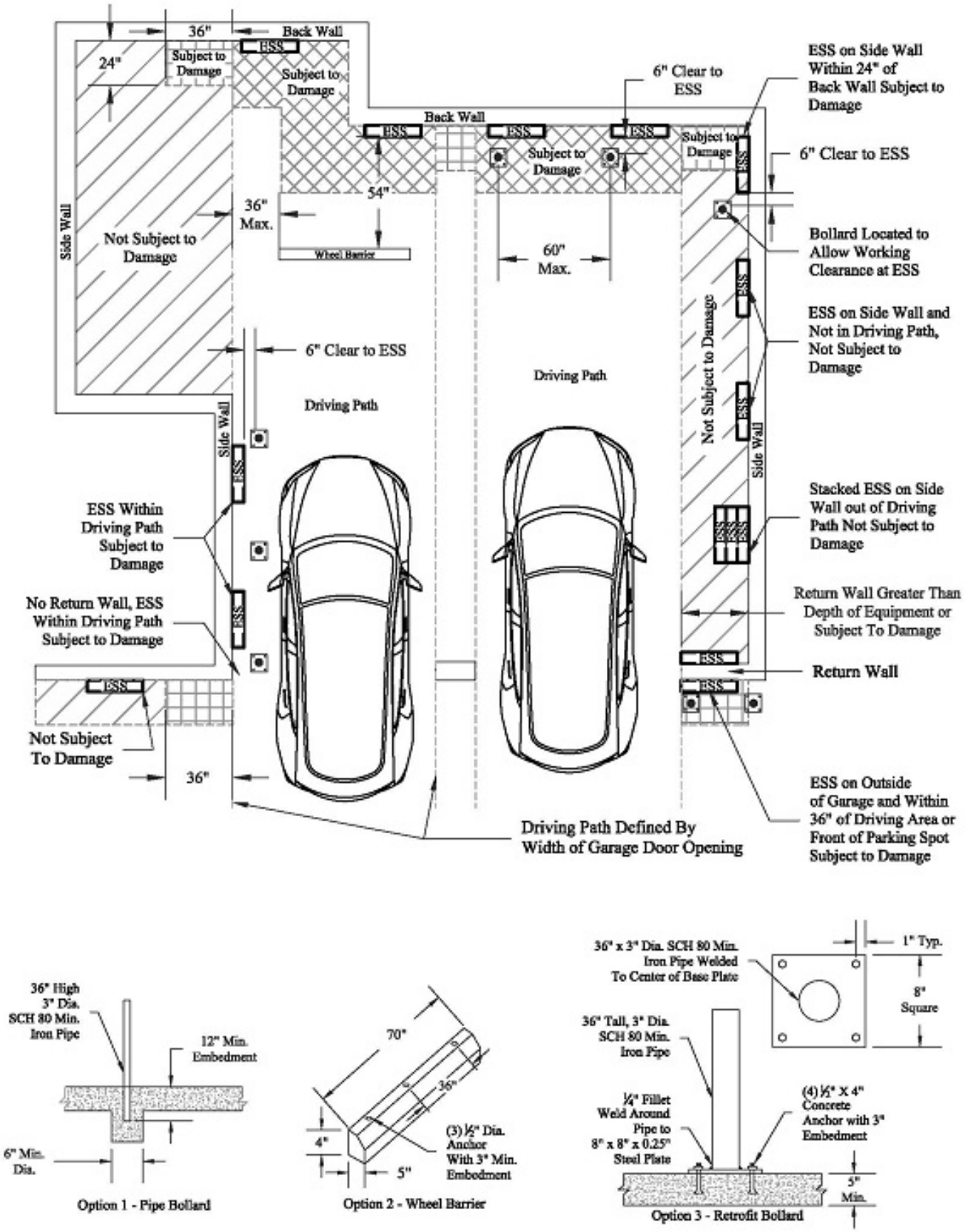
1207.11.7 Protection from impact. ESS installed in a location subject to vehicle damage in accordance with Section 1207.11.7.1 or 1207.11.7.2 shall be provided with impact protection in accordance with Section 1207.11.7.3.

1207.11.7.1 Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section 1207.11.3 shall be provided. The normal driving path is a space between the garage vehicle opening and the interior face of the back wall to a height of 48 inches (1219 mm) above the finished floor. The width of the normal driving path shall be equal to the width of the garage door opening. Impact protection shall also be provided for an ESS installed at either of the following locations (see Figure 1207.11.7.1):

1. On the interior face of the back wall and located within 36 inches (914 mm) to the left or to the right of the normal driving path.
2. On the interior face of a side wall and located within 24 inches (610 mm) of the back wall and 36 inches (914 mm) of the normal driving path.

Exception: Where the clear height of the vehicle garage opening is 7 feet 6 inches (2286 mm) or less, ESS installed not less than 36 inches (914 mm) above the finished floor are not subject to vehicle impact protection requirements.

FIGURE 1207.11.7.1—ESS VEHICLE IMPACT PROTECTION


36"
Back Wall
24"
Subject to Damage
ESS
Subject to Damage
6" Clear to ESS
ESS on Side Wall Within 24" of Back Wall Subject to Damage
Back Wall
ESS
ESS
ESS
Subject to Damage
Subject to Damage
6" Clear to ESS
54"
Side Wall
36" Max.
Not Subject to Damage
Wheel Barrier
60" Max.
Bollard Located to Allow Working Clearance at ESS
ESS on Side Wall and Not in Driving Path, Not Subject to Damage
Not Subject to Damage
6" Clear to ESS
Driving Path
Driving Path
Side Wall
Side Wall
ESS
ESS
ESS
ESS
ESS
ESS
ESS
ESS
ESS Within Driving Path Subject to Damage
Stacked ESS on Side Wall out of Driving Path Not Subject to Damage
No Return Wall, ESS Within Driving Path Subject to Damage
Return Wall Greater Than Depth of Equipment or Subject To Damage
Return Wall
ESS
ESS
Not Subject To Damage
36"
ESS on Outside of Garage and Within 36" of Driving Area or Front of Parking Spot Subject to Damage
Driving Path Defined By Width of Garage Door Opening
36" High 3" Dia. SCH 80 Min. Iron Pipe
12" Min. Embedment
6" Min. Dia.
Option 1 - Pipe Bollard
70"
36"
4"
5"
(3) ½" Dia. Anchor With 3" Min. Embedment
Option 2 - Wheel Barrier
36" x 3" Dia. SCH 80 Min. Iron Pipe Welded To Center of Base Plate
1" Typ.
8" Square
36" Tall, 3" Dia. SCH 80 Min. Iron Pipe
¼" Fillet Weld Around Pipe to 8" x 8" x 0.25" Steel Plate
(4) ½" X 4" Concrete Anchor with 3" Embedment
5" Min.
Option 3 - Retrofit Bollard

1207.11.7.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section 1207.11.7.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section 1207.11.7.3.

1207.11.7.3 Impact protection options. Where ESS is required to be protected from impact in accordance with Section 1207.11.7.1 or 1207.11.7.2, such protection shall comply with one of the following:

1. Bollards constructed in accordance with one of the following:
    1.1. Minimum 48 inches (1219 mm) in length by 3 inches (76 mm) in diameter Schedule 80 steel pipe embedded in a concrete pier not less than 12 inches (304 mm) deep and 6 inches (152 mm) in diameter, with at least 36 inches (914 mm) of pipe exposed, filled with concrete and spaced at a maximum interval of 5 feet (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from an ESS.
    1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a minimum 8 inches (203 mm) by ¼-inch (6.4 mm) thick steel plate and bolted to a concrete floor by means of four ½-inch (13 mm) concrete anchors with 3-inch (76 mm) minimum embedment. Spacing shall be not greater than 60 inches (1524 mm), and each bollard shall be located not less than 6 inches (152 mm) from the ESS.
    1.3. Premanufactured steel pipe bollards shall be filled with concrete and anchored in accordance with the manufacturer's installation instructions, with spacing not greater than 60 inches (1524 mm). Each bollard shall be located not less than 6 inches (152 mm) from the ESS.
2. Wheel barriers constructed in accordance with one of the following:
    2.1. Four inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length wheel barrier made of concrete or polymer, anchored to the concrete floor not less than every 36 inches (914 mm) and located not less than 54 inches (1372 mm) from the ESS. Minimum 3½-inch (89 mm) diameter concrete anchors with 3-inch (76 mm) embedment per barrier shall be used. Spacing between barriers shall be not greater than 36 inches (914 mm).
    2.2. Premanufactured wheel barriers shall be anchored in accordance with the manufacturer's installation instructions.
3. Approved method designed to resist a 2,000-pound-force (8896 N) impact in the direction of travel at 24 inches (610 mm) above grade.

1207.11.8 Ventilation. Indoor installations of ESS that include batteries that produce hydrogen or other flammable gases during charging shall be provided with exhaust ventilation in accordance with Section 304.5 of the *California Mechanical Code*. (Material based on NFPA 855 2023 Ed.)

1207.11.9 Electric vehicle use. The temporary use of an owner or occupant's electric-powered vehicle to power a dwelling unit or sleeping unit while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions and *the California Electrical Code.* (Material based on NFPA 855 2023 Ed.)

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CHAPTERS

13–19 RESERVED

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 20 – AVIATION FACILITIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
20
AVIATION FACILITIES

User notes:

About this chapter: Chapter 20 specifies minimum requirements for the fire-safe operation of airports, heliports and helistops. The principal nonflight operational hazards associated with aviation involve fuel, facilities and operations. Therefore, safe use of flammable and combustible liquids during fueling and maintenance operations is emphasized. Availability of portable Class B:C-rated fire extinguishers for prompt control or suppression of incipient fires is required.

SECTION 2001—GENERAL

2001.1 Scope. Airports, heliports, helistops and aircraft hangars shall be in accordance with this chapter.

2001.2 Regulations not covered. Regulations not specifically contained herein pertaining to airports, aircraft maintenance, aircraft hangars and appurtenant operations shall be in accordance with nationally recognized standards.

2001.3 Permits. For permits to operate aircraft-refueling vehicles, application of flammable or combustible finishes and hot work, see Section 105.5.

SECTION 2002—DEFINITIONS

2002.1 Definitions. The following terms are defined in Chapter 2:

AIRCRAFT OPERATION AREA (AOA).

AIRPORT.

HELIPORT.

HELISTOP.

SECTION 2003—GENERAL PRECAUTIONS

2003.1 Sources of ignition. Open flames, flame-producing devices and other sources of ignition shall not be permitted in a hangar, except in approved locations or in any location within 50 feet (15 240 mm) of an aircraft-fueling operation.

2003.2 Smoking. Smoking shall be prohibited in aircraft-refueling vehicles, aircraft hangars and aircraft operation areas used for cleaning, paint removal, painting operations or fueling. “No Smoking” signs shall be provided in accordance with Section 310.

Exception: Designated and approved smoking areas.

2003.3 Housekeeping. The aircraft operation area (AOA) and related areas shall be kept free from combustible debris at all times.

2003.4 Fire department access. Fire apparatus access roads shall be provided and maintained in accordance with Chapter 5. Fire apparatus access roads and aircraft parking positions shall be designed in a manner so as to preclude the possibility of fire vehicles traveling under any portion of a parked aircraft.

2003.5 Dispensing of flammable and combustible liquids. The dispensing, transferring and storage of flammable and combustible liquids shall be in accordance with this chapter and Chapter 57. Aircraft motor vehicle fuel-dispensing facilities shall be in accordance with Chapter 23.

2003.6 Combustible storage. Combustible materials stored in aircraft hangars shall be stored in approved locations and containers.

2003.7 Hazardous material storage. Hazardous materials shall be stored in accordance with Chapter 50.

SECTION 2004—AIRCRAFT MAINTENANCE

2004.1 Transferring flammable and combustible liquids. Flammable and combustible liquids shall not be dispensed into or removed from a container, tank, vehicle or aircraft except in approved locations.

2004.2 Application of flammable and combustible liquid finishes. The application of flammable or Class II combustible liquid finishes is prohibited unless both of the following conditions are met:

1. The application of the liquid finish is accomplished in an approved location.
2. The application methods and procedures are in accordance with Chapter 24.

2004.3 Cleaning parts. Class IA flammable liquids shall not be used to clean aircraft, aircraft parts or aircraft engines. Cleaning with other flammable and combustible liquids shall be in accordance with Section 5705.3.6.

2004.4 Spills. Sections 2004.4.1 through 2004.4.3 shall apply to spills of flammable and combustible liquids and other hazardous materials. Fuel spill control shall also comply with Section 2006.11.

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2004.4.1 Cessation of work. Activities in the affected area not related to the mitigation of the spill shall cease until the spilled material has been removed or the hazard has been mitigated.

2004.4.2 Vehicle movement. Aircraft or other vehicles shall not be moved through the spill area until the spilled material has been removed or the hazard has been mitigated.

2004.4.3 Mitigation. Spills shall be reported, documented and mitigated in accordance with the provisions of this chapter and Section 5003.3.

2004.5 Running engines. Aircraft engines shall not be run in aircraft hangars except in approved engine test areas.

2004.6 Open flame. Repairing of aircraft requiring the use of open flames, spark-producing devices or the heating of parts above 500°F (260°C) shall only be done outdoors or in an area complying with the provisions of the *California Building Code* for a Group F-1 occupancy.

2004.7 Other aircraft maintenance. Maintenance, repairs, modifications, or construction performed on aircraft not addressed elsewhere in this code shall be conducted in accordance with NFPA 410.

SECTION 2005—PORTABLE FIRE EXTINGUISHERS

2005.1 General. Portable fire extinguishers suitable for flammable or combustible liquid and electrical-type fires shall be provided as specified in Sections 2005.2 through 2005.6 and Section 906. Extinguishers required by this section shall be inspected and maintained in accordance with Section 906.

2005.2 On towing vehicles. Vehicles used for towing aircraft shall be equipped with not less than one listed portable fire extinguisher complying with Section 906 and having a minimum rating of 20-B:C.

2005.3 On welding apparatus. Welding apparatus shall be equipped with not less than one listed portable fire extinguisher complying with Section 906 and having a minimum rating of 2-A:20-B:C.

2005.4 On aircraft fuel-servicing tank vehicles. Aircraft fuel-servicing tank vehicles shall be equipped with not less than two listed portable fire extinguishers complying with Section 906, each having a minimum rating of 20-B:C. A portable fire extinguisher shall be provided with ready access from either side of the vehicle.

2005.5 On hydrant fuel-servicing vehicles. Hydrant fuel-servicing vehicles shall be equipped with not less than one listed portable fire extinguisher complying with Section 906 and having a minimum rating of 20-B:C.

2005.6 At fuel-dispensing stations. Portable fire extinguishers at fuel-dispensing stations shall be located such that pumps or dispensers are not more than 75 feet (22 860 mm) from one such extinguisher. Fire extinguishers shall be provided as follows:

1. Where the open-hose discharge capacity of the fueling system is not more than 200 gallons per minute (13 L/s), not less than two listed portable fire extinguishers complying with Section 906 and having a minimum rating of 20-B:C shall be provided.
2. Where the open-hose discharge capacity of the fueling system is more than 200 gallons per minute (13 L/s) but not more than 350 gallons per minute (22 L/s), not less than one listed wheeled extinguisher complying with Section 906 and having a minimum extinguishing rating of 80-B:C, and a minimum agent capacity of 125 pounds (57 kg), shall be provided.
3. Where the open-hose discharge capacity of the fueling system is more than 350 gallons per minute (22 L/s), not less than two listed wheeled extinguishers complying with Section 906 and having a minimum rating of 80-B:C each, and a minimum capacity agent of 125 pounds (57 kg) each, shall be provided.

2005.7 Fire extinguisher access. Access to portable fire extinguishers required by this chapter shall be maintained at all times. Where necessary, provisions shall be made to clear accumulations of snow, ice and other forms of weather-induced obstructions.

2005.7.1 Cabinets. Cabinets and enclosed compartments used to house portable fire extinguishers shall be clearly marked with the words “FIRE EXTINGUISHER” in letters not less than 2 inches (51 mm) high. Cabinets and compartments shall be provided with ready access at all times.

2005.8 Reporting use. Use of a fire extinguisher under any circumstances shall be immediately reported to the manager of the airport and the fire code official.

SECTION 2006—AIRCRAFT FUELING

2006.1 Aircraft motor vehicle fuel-dispensing facilities. Aircraft motor vehicle fuel-dispensing facilities shall be in accordance with Chapter 23.

2006.2 Airport fuel systems. Airport fuel systems shall be designed and constructed in accordance with NFPA 407.

2006.3 Construction of aircraft-fueling vehicles and accessories. Aircraft-fueling vehicles shall comply with this section and shall be designed and constructed in accordance with NFPA 407.

2006.3.1 Transfer apparatus. Aircraft-fueling vehicles shall be equipped and maintained with an approved transfer apparatus.

2006.3.1.1 Internal combustion type. Where such transfer apparatus is operated by an individual unit of the internal-combustion-motor type, such power unit shall be located as remotely as practicable from pumps, piping, meters, air eliminators, water separators, hose reels and similar equipment, and shall be housed in a separate compartment from any of the aforementioned items. The fuel tank in connection therewith shall be suitably designed and installed, and the maximum fuel capacity shall not exceed 5 gallons (19 L) where the tank is installed on the engine. The exhaust pipe, muffler and tail pipe shall be shielded.

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2006.3.1.2 Gear operated. Where operated by gears or chains, the gears, chains, shafts, bearings, housing and all parts thereof shall be of an approved design and shall be installed and maintained in an approved manner.

2006.3.1.3 Vibration isolation. Flexible connections for the purpose of eliminating vibration are allowed if the material used therein is designed, installed and maintained in an approved manner, provided that such connections do not exceed 24 inches (610 mm) in length.

2006.3.2 Pumps. Pumps of a positive-displacement type shall be provided with a bypass relief valve set at a pressure of not more than 35 percent in excess of the normal working pressure of such unit. Such units shall be equipped and maintained with a pressure gauge on the discharge side of the pump.

2006.3.3 Dispensing hoses and nozzles. Hoses shall be designed for the transferring of hydrocarbon liquids and shall not be any longer than necessary to provide efficient fuel-transfer operations. Hoses shall be equipped with an approved shutoff nozzle. Fuel-transfer nozzles shall be self-closing and designed to be actuated by hand pressure only. Notches and other devices shall not be used for holding a nozzle valve handle in the open position. Nozzles shall be equipped with a bonding cable complete with proper attachment for aircraft to be serviced.

2006.3.4 Protection of electrical equipment. Electric wiring, switches, lights and other sources of ignition, where located in a compartment housing piping, pumps, air eliminators, water separators, hose reels or similar equipment, shall be enclosed in a vapor-tight housing. Electrical motors located in such a compartment shall be of a type approved for use as specified in *the California Electrical Code*.

2006.3.5 Venting of equipment compartments. Compartments housing piping, pumps, air eliminators, water separators, hose reels and similar equipment shall be adequately ventilated at floor level or within the floor itself.

2006.3.6 Accessory equipment. Ladders, hose reels and similar accessory equipment shall be of an approved type and constructed substantially as follows:

1. Ladders constructed of noncombustible material are allowed to be used with or attached to aircraft-fueling vehicles, provided that the manner of attachment or use of such ladders is approved and does not constitute an additional fire or accident hazard in the operation of such fueling vehicles.
2. Hose reels used in connection with fueling vehicles shall be constructed of noncombustible materials and shall be provided with a packing gland or other device that will preclude fuel leakage between reels and fuel manifolds.

2006.3.7 Electrical bonding provisions. Transfer apparatus shall be metallically interconnected with tanks, chassis, axles and springs of aircraft-fueling vehicles.

2006.3.7.1 Bonding cables. Aircraft-fueling vehicles shall be provided and maintained with a substantial heavy-duty electrical cable of sufficient length to be bonded to the aircraft to be serviced. Such cable shall be metallically connected to the transfer apparatus or chassis of the aircraft-fueling vehicle on one end and shall be provided with a suitable metal clamp on the other end, to be fixed to the aircraft.

2006.3.7.2 Bonding cable protection. The bonding cable shall be bare or have a transparent protective sleeve and be stored on a reel or in a compartment provided for no other purpose. It shall be carried in such a manner that it will not be subjected to sharp kinks or accidental breakage under conditions of general use.

2006.3.8 Smoking. Smoking in aircraft-fueling vehicles is prohibited. Signs to this effect shall be conspicuously posted in the driver's compartment of all fueling vehicles.

2006.3.9 Smoking equipment. Smoking equipment such as cigarette lighters and ash trays shall not be provided in aircraft-fueling vehicles.

2006.4 Operation, maintenance and use of aircraft-fueling vehicles. The operation, maintenance and use of aircraft-fueling vehicles shall be in accordance with Sections 2006.4.1 through 2006.4.4 and other applicable provisions of this chapter.

2006.4.1 Proper maintenance. Aircraft-fueling vehicles and all related equipment shall be properly maintained and kept in good repair. Accumulations of oil, grease, fuel and other flammable or combustible materials is prohibited. Maintenance and servicing of such equipment shall be accomplished in approved areas.

2006.4.2 Vehicle integrity. Tanks, pipes, hoses, valves and other fuel delivery equipment shall be maintained leak free at all times.

2006.4.3 Removal from service. Aircraft-fueling vehicles and related equipment that are in violation of Section 2006.4.1 or 2006.4.2 shall be immediately defueled and removed from service and shall not be returned to service until proper repairs have been made.

2006.4.4 Operators. Aircraft-fueling vehicles that are operated by a person, firm or corporation other than the permittee or the permittee's authorized employee shall be provided with a legible sign visible from outside the vehicle showing the name of the person, firm or corporation operating such unit.

2006.5 Fueling and defueling. Aircraft-fueling and defueling operations shall be in accordance with Sections 2006.5.1 through 2006.5.5.

2006.5.1 Positioning of aircraft-fueling vehicles. Aircraft-fueling vehicles shall not be located, parked or permitted to stand in a position where such unit would obstruct egress from an aircraft should a fire occur during fuel-transfer operations. Aircraft-fueling vehicles shall not be located, parked or permitted to stand under any portion of an aircraft.

Exception: Aircraft-fueling vehicles shall be allowed to be located under aircraft wings during underwing fueling of turbine-engine powered aircraft.

2006.5.1.1 Fueling vehicle egress. A clear path shall be maintained for aircraft-fueling vehicles to provide for prompt and timely egress from the fueling area.

2006.5.1.2 Aircraft vent openings. A clear space of not less than 10 feet (3048 mm) shall be maintained between aircraft fuel-system vent openings and any part or portion of an aircraft-fueling vehicle.

2006.5.1.3 Parking. Prior to leaving the cab, the aircraft-fueling vehicle operator shall ensure that the parking brake has been set. Not less than two chock blocks not less than 5 inches by 5 inches by 12 inches (127 mm by 127 mm by 305 mm) in size and dished to fit the contour of the tires shall be utilized and positioned in such a manner as to preclude movement of the vehicle in any direction.

2006.5.2 Electrical bonding. Aircraft-fueling vehicles shall be electrically bonded to the aircraft being fueled or defueled. Bonding connections shall be made prior to making fueling connections and shall not be disconnected until the fuel-transfer operations are completed and the fueling connections have been removed.

Where a hydrant service vehicle or cart is used for fueling, the hydrant coupler shall be connected to the hydrant system prior to bonding the fueling equipment to the aircraft.

2006.5.2.1 Conductive hose. In addition to the bonding cable required by Section 2006.5.2, conductive hose shall be used for all fueling operations.

2006.5.2.2 Bonding conductors on transfer nozzles. Transfer nozzles shall be equipped with approved bonding conductors that shall be clipped or otherwise positively engaged with the bonding attachment provided on the aircraft adjacent to the fuel tank cap prior to removal of the cap.

Exception: In the case of overwing fueling where an appropriate bonding attachment adjacent to the fuel fill port has not been provided on the aircraft, the fueling operator shall touch the fuel tank cap with the nozzle spout prior to removal of the cap. The nozzle shall be kept in contact with the fill port until fueling is completed.

2006.5.2.3 Funnels. Where required, metal funnels are allowed to be used during fueling operations. Direct contact between the fueling receptacle, the funnel and the fueling nozzle shall be maintained during the fueling operation.

2006.5.3 Training. Aircraft-fueling vehicles shall be attended and operated only by persons instructed in methods of proper use and operation and who are qualified to use such fueling vehicles in accordance with minimum safety requirements.

2006.5.3.1 Fueling hazards. Fuel-servicing personnel shall know and understand the hazards associated with each type of fuel dispensed by the airport fueling-system operator.

2006.5.3.2 Fire safety training. Employees of fuel agents who fuel aircraft, accept fuel shipments or otherwise handle fuel shall receive approved fire safety training.

2006.5.3.2.1 Fire extinguisher training. Fuel-servicing personnel shall receive approved training in the operation of fire-extinguishing equipment.

2006.5.3.2.2 Records. The airport fueling-system operator shall maintain records of all training administered to its employees.

2006.5.4 Transfer personnel. During fuel-transfer operations, a qualified person shall be in control of each transfer nozzle and another qualified person shall be in immediate control of the fuel-pumping equipment to shut off or otherwise control the flow of fuel from the time fueling operations are begun until they are completed.

Exceptions:

1. For underwing refueling, the person stationed at the point of fuel intake is not required.
2. For overwing refueling, the person stationed at the fuel-pumping equipment shall not be required where the person at the fuel-dispensing device is within 75 feet (22 800 mm) of the emergency shutoff device; is not on the wing of the aircraft and has a clear and unencumbered path to the fuel-pumping equipment; and the fuel-dispensing line does not exceed 50 feet (15 240 mm) in length.

The fueling operator shall monitor the panel of the fueling equipment and the aircraft control panel during pressure fueling or shall monitor the fill port during overwing fueling.

2006.5.5 Fuel flow control. Fuel flow-control valves shall be operable only by the direct hand pressure of the operator. Removal of the operator's hand pressure shall cause an immediate cessation of the flow of fuel.

2006.6 Emergency fuel shutoff. Emergency fuel shutoff controls and procedures shall comply with Sections 2006.6.1 through 2006.6.4.

2006.6.1 Controls. Emergency fuel shutoff controls shall be provided with ready access at all times when the fueling system is being operated.

2006.6.2 Notification of the fire department. The fueling-system operator shall establish a procedure by which the fire department will be notified in the event of an activation of an emergency fuel shutoff control.

2006.6.3 Determining cause. Prior to reestablishment of normal fuel flow, the cause of fuel shutoff conditions shall be determined and corrected.

2006.6.4 Testing. Emergency fuel shutoff devices shall be operationally tested at intervals not exceeding three months. The fueling-system operator shall maintain testing records.

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2006.7 Protection of hoses. Before an aircraft-fueling vehicle is moved, fuel-transfer hoses shall be properly placed on the approved reel or in the compartment provided, or stored on the top decking of the fueling vehicle if proper height rail is provided for security and protection of such equipment. Fuel-transfer hose shall not be looped or draped over any part of the fueling vehicle, except as herein provided. Fuel-transfer hose shall not be dragged when such fueling vehicle is moved from one fueling position to another.

2006.8 Loading and unloading. Aircraft-fueling vehicles shall be loaded only at an approved loading rack. Such loading racks shall be in accordance with Section 5706.5.1.12.

Exceptions:

1. Aircraft-refueling units are allowed to be loaded from the fuel tanks of an aircraft during defueling operations.
2. Fuel transfer between tank vehicles is allowed to be performed in accordance with Section 5706.6 where the operation is not less than 200 feet (60 960 mm) from an aircraft.

The fuel cargo of such units shall be unloaded only by approved transfer apparatus into the fuel tanks of aircraft, underground storage tanks or approved gravity storage tanks.

2006.9 Passengers. Passenger traffic is allowed during the time fuel-transfer operations are in progress, provided that the following provisions are strictly enforced by the owner of the aircraft or the owner's authorized employee:

1. Smoking and producing an open flame in the cabin of the aircraft or the outside thereof within 50 feet (15 240 mm) of such aircraft shall be prohibited.

   A qualified employee of the aircraft owner shall be responsible for seeing that the passengers are not allowed to smoke when remaining aboard the aircraft or while going across the ramp from the gate to such aircraft, or vice versa.
2. Passengers shall not be permitted to linger about the plane, but shall proceed directly between the loading gate and the aircraft.
3. Passenger loading stands or walkways shall be left in loading position until all fuel-transfer operations are completed.
4. Fuel-transfer operations shall not be performed on the main exit side of any aircraft containing passengers except when the owner of such aircraft or a capable and qualified employee of such owner remains inside the aircraft to direct and assist the escape of such passengers through regular and emergency exits in the event fire should occur during fuel-transfer operations.

2006.10 Sources of ignition. Smoking and producing open flames within 50 feet (15 240 mm) of a point where fuel is being transferred shall be prohibited. Electrical and motor-driven devices shall not be connected to or disconnected from an aircraft at any time fueling operations are in progress on such aircraft.

2006.11 Fuel spill prevention and procedures. Fuel spill prevention and the procedures for handling spills shall comply with Sections 2006.11.1 through 2006.11.7.

2006.11.1 Fuel-servicing equipment maintenance. Aircraft fuel-servicing equipment shall be maintained and kept free from leaks. Fuel-servicing equipment that malfunctions or leaks shall not be continued in service.

2006.11.2 Transporting fuel nozzles. Fuel nozzles shall be carried utilizing appropriate handles. Dragging fuel nozzles along the ground shall be prohibited.

2006.11.3 Drum fueling. Fueling from drums or other containers having a capacity greater than 5 gallons (19 L) shall be accomplished with the use of an approved pump.

2006.11.4 Fuel spill procedures. The fueling-system operator shall establish procedures to follow in the event of a fuel spill. These procedures shall be comprehensive and shall provide for all of the following:

1. Upon observation of a fuel spill, the aircraft-fueling operator shall immediately stop the delivery of fuel by releasing hand pressure from the fuel flow-control valve.
2. Failure of the fuel control valve to stop the continued spillage of fuel shall be cause for the activation of the appropriate emergency fuel shutoff device.
3. A supervisor for the fueling-system operator shall respond to the fuel spill area immediately.

2006.11.5 Notification of the fire department. The fire department shall be notified of any fuel spill that is considered a hazard to people or property or which meets one or more of the following criteria:

1. Any dimension of the spill is greater than 10 feet (3048 mm).
2. The spill area is greater than 50 square feet (4.65 m^2).
3. The fuel flow is continuous in nature.

2006.11.6 Investigation required. An investigation shall be conducted by the fueling-system operator of all spills requiring notification of the fire department. The investigation shall provide conclusive proof of the cause and verification of the appropriate use of emergency procedures. Where it is determined that corrective measures are necessary to prevent future incidents of the same nature, they shall be implemented immediately.

2006.11.7 Multiple fuel delivery vehicles. Simultaneous delivery of fuel from more than one aircraft-fueling vehicle to a single aircraft-fueling manifold is prohibited unless proper backflow prevention devices are installed to prevent fuel flow into the tank vehicles.

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2006.12 Aircraft engines and heaters. Operation of aircraft onboard engines and combustion heaters shall be terminated prior to commencing fuel-servicing operations and shall remain off until the fuel-servicing operation is completed.

Exception: In an emergency, a single jet engine is allowed to be operated during fuel servicing where all of the following conditions are met:

1. The emergency shall have resulted from an onboard failure of the aircraft's auxiliary power unit.
2. Restoration of auxiliary power to the aircraft by ground support services is not available.
3. The engine to be operated is either at the rear of the aircraft or on the opposite side of the aircraft from the fuel-servicing operation.
4. The emergency operation is in accordance with a written procedure approved by the fire code official.

2006.13 Vehicle and equipment restrictions. During aircraft-fueling operations, only the equipment actively involved in the fueling operation is allowed within 50 feet (15 240 mm) of the aircraft being fueled. Other equipment shall be prohibited in this area until the fueling operation is complete.

A clear space of not less than 10 feet (3048 mm) shall be maintained between aircraft fuel-system vent openings and any part or portion of aircraft-servicing vehicles or equipment.

Exception: Aircraft-fueling operations utilizing single-point refueling with a sealed, mechanically locked fuel line connection and the fuel is not a Class I flammable liquid.

2006.13.1 Overwing fueling. Vehicles or equipment shall not be allowed beneath the trailing edge of the wing when aircraft fueling takes place over the wing and the aircraft fuel-system vents are located on the upper surface of the wing.

2006.14 Electrical equipment. Electrical equipment, including but not limited to, battery chargers, ground or auxiliary power units, fans, compressors or tools, shall not be operated, nor shall they be connected or disconnected from their power source, during fuel-servicing operations.

2006.14.1 Other equipment. Electrical or other spark-producing equipment shall not be used within 10 feet (3048 mm) of fueling equipment, aircraft fill or vent points, or spill areas unless that equipment is intrinsically safe and approved for use in an explosive atmosphere.

2006.15 Open flames. Open flames and open-flame devices are prohibited within 50 feet (15 240 mm) of any aircraft fuel-servicing operation or fueling equipment.

2006.15.1 Other areas. The fire code official is authorized to establish other locations where open flames and open-flame devices are prohibited.

2006.15.2 Matches and lighters. Personnel assigned to and engaged in fuel-servicing operations shall not carry matches or lighters on or about their person. Matches or lighters shall be prohibited in, on or about aircraft-fueling equipment.

2006.16 Lightning procedures. The fire code official is authorized to require the airport authority and the fueling-system operator to establish written procedures to follow when lightning flashes are detected on or near the airport. These procedures shall establish criteria for the suspension and resumption of aircraft-fueling operations.

2006.17 Fuel-transfer locations. Aircraft fuel-transfer operations shall be prohibited indoors.

Exception: In aircraft hangars built in accordance with the provisions of the *California Building Code* for Group F-1 occupancies, aircraft fuel-transfer operations are allowed where either of the following conditions exist:

1. Necessary to accomplish aircraft fuel-system maintenance operations. Such operations shall be performed in accordance with nationally recognized standards.
2. The fuel being used has a flash point greater than 100°F (37.8°C).

2006.17.1 Position of aircraft. Aircraft being fueled shall be positioned such that any fuel system vents and other fuel tank openings are not less than:

1. Twenty-five feet (7620 mm) from buildings or structures other than jet bridges.
2. Fifty feet (15 240 mm) from air intake vents for boiler, heater or incinerator rooms.

2006.17.2 Fire equipment access. Access for fire service equipment to aircraft shall be maintained during fuel-servicing operations.

2006.18 Defueling operations. The requirements for fueling operations contained in this section shall also apply to aircraft defueling operations. Additional procedures shall be established by the fueling-system operator to prevent overfilling of the tank vehicle used in the defueling operation.

2006.19 Maintenance of aircraft-fueling hose. Aircraft-fueling hoses shall be maintained in accordance with Sections 2006.19.1 through 2006.19.4.

2006.19.1 Inspections. Hoses used to fuel or defuel aircraft shall be inspected periodically to ensure their serviceability and suitability for continued service. The fuel service operator shall maintain records of all tests and inspections performed on fueling hoses. Hoses found to be defective or otherwise damaged shall be immediately removed from service.

2006.19.1.1 Daily inspection. Each hose shall be inspected daily. This inspection shall include a complete visual scan of the exterior for evidence of damage, blistering or leakage. Each coupling shall be inspected for evidence of leaks, slippage or misalignment.

2006.19.1.2 Monthly inspection. A more thorough inspection, including pressure testing, shall be accomplished for each hose on a monthly basis. This inspection shall include examination of the fuel delivery inlet screen for rubber particles, which indicates problems with the hose lining.

2006.19.2 Damaged hose. Hose that has been subjected to severe abuse shall be immediately removed from service. Such hoses shall be hydrostatically tested prior to being returned to service.

2006.19.3 Repairing hose. Hoses are allowed to be repaired by removing the damaged portion and recoupling the undamaged end. When recoupling hoses, only couplings designed and approved for the size and type of hose in question shall be used. Hoses repaired in this manner shall be visually inspected and hydrostatically tested prior to being placed back in service.

2006.19.4 New hose. New hose shall be visually inspected prior to being placed into service.

2006.20 Aircraft fuel-servicing vehicles parking. Unattended aircraft fuel-servicing vehicles shall be parked in areas that provide for both the unencumbered dispersal of vehicles in the event of an emergency and the control of leakage such that adjacent buildings and storm drains are not contaminated by leaking fuel.

2006.20.1 Parking area design. Parking areas for tank vehicles shall be designed and utilized such that a clearance of 10 feet (3048 mm) is maintained between each parked vehicle for fire department access. In addition, a minimum clearance of 50 feet (15 240 mm) shall be maintained between tank vehicles and parked aircraft and structures other than those used for the maintenance or garaging of aircraft fuel-servicing vehicles.

2006.21 Radar equipment. Aircraft fuel-servicing operations shall be prohibited while the weather-mapping radar of that aircraft is operating.

Aircraft fuel-servicing or other operations in which flammable liquids, vapors or mists could be present shall not be conducted within 300 feet (91 440 mm) of an operating aircraft surveillance radar.

Aircraft fuel-servicing operations shall not be conducted within 300 feet (91 440 mm) of airport flight traffic surveillance radar equipment.

Aircraft fuel-servicing or other operations in which flammable liquids, vapors or mists could be present shall not be conducted within 100 feet (30 480 mm) of airport ground traffic surveillance radar equipment.

2006.21.1 Direction of radar beams. The beam from ground radar equipment shall not be directed toward fuel storage or loading racks.

Exceptions:

1. Fuel storage and loading racks in excess of 300 feet (91 440 mm) from airport flight traffic surveillance equipment.
2. Fuel storage and loading racks in excess of 100 feet (30 480 mm) from airport ground traffic surveillance equipment.

SECTION 2007—HELISTOPS AND HELIPORTS

2007.1 General. Helistops and heliports shall be maintained in accordance with Sections 2007.2 through 2007.8. Helistops and heliports on buildings shall be constructed in accordance with the *California Building Code*.

2007.2 Clearances. The touchdown area shall be surrounded on all sides by a clear area having minimum average width at roof level of 15 feet (4572 mm) and not less than 5 feet (1524 mm) at any point. The clear area shall be maintained.

2007.3 Flammable and Class II combustible liquid spillage. Landing areas on structures shall be maintained so as to confine flammable or Class II combustible liquid spillage to the landing area itself, and provisions shall be made to drain such spillage away from exits or stairways serving the helicopter landing area or from a structure housing such exit or stairway.

2007.4 Exits. Exits and stairways shall be maintained in accordance with Section 412.7 of the *California Building Code*.

2007.5 Standpipe systems. A building with a rooftop helistop or heliport shall be provided with a Class I or III standpipe system extended to the roof level on which the helistop or heliport is located. All portions of the helistop and heliport area shall be within 150 feet (45 720 mm) of a $2^{1}/_{2}$-inch (63.5 mm) outlet on the standpipe system.

2007.6 Foam protection. Foam fire-protection capabilities shall be provided for rooftop heliports. Such systems shall be designed, installed and maintained in accordance with the applicable provisions of Sections 903, 904 and 905.

2007.7 Fire extinguishers. Not less than one portable fire extinguisher having a minimum 80-B:C rating shall be provided for each permanent takeoff and landing area and for the aircraft parking areas. Installation, inspection and maintenance of these extinguishers shall be in accordance with Section 906.

2007.8 Federal approval. Before operating helicopters from helistops and heliports, approval shall be obtained from the Federal Aviation Administration.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 21 – DRY CLEANING

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
2101.1.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

21 DRY CLEANING

User notes:

About this chapter: Chapter 21 provides provisions that are intended to reduce hazards associated with use of flammable and combustible dry cleaning solvents. These materials, like all volatile organic chemicals, generate significant quantities of static electricity and are thus readily ignitable. Many flammable and nonflammable dry cleaning solvents also possess health hazards when involved in a fire.

SECTION 2101—GENERAL

2101.1 Scope. Dry cleaning plants and their operations shall comply with the requirements of this chapter.

2101.1.1 Compliance alternate for dry cleaning plants. *Dry cleaning plants shall be permitted to comply with the provisions of NFPA 32 in its entirety as an acceptable alternative to the requirements of this chapter.*

2101.2 Permit required. Permits shall be required as set forth in Section 105.5.

SECTION 2102—DEFINITIONS

2102.1 Definitions. The following terms are defined in Chapter 2:

DRY CLEANING.

DRY CLEANING PLANT.

DRY CLEANING ROOM.

DRY CLEANING SYSTEM.

SOLVENT OR LIQUID CLASSIFICATIONS.

Class I solvents.

Class II solvents.

Class IIIA solvents.

Class IIIB solvents.

Class IV solvents.

SECTION 2103—CLASSIFICATIONS

2103.1 Solvent classification. Dry cleaning solvents shall be classified according to their flash points as follows:

1. Class I solvents are liquids having a flash point below 100°F (38°C).
2. Class II solvents are liquids having a flash point at or above 100°F (38°C) and below 140°F (60°C).
3. Class IIIA solvents are liquids having a flash point at or above 140°F (60°C) and below 200°F (93°C).
4. Class IIIB solvents are liquids having a flash point at or above 200°F (93°C).
5. Class IV solvents are liquids classified as nonflammable.

2103.2 Classification of dry cleaning plants and systems. Dry cleaning plants and systems shall be classified based on the solvents used as follows:

1. Type I—systems using Class I solvents.
2. Type II—systems using Class II solvents.
3. Type III-A—systems using Class IIIA solvents.
4. Type III-B—systems using Class IIIB solvents.
5. Type IV—systems using Class IV solvents in which dry cleaning is not conducted by the public.
6. Type V—systems using Class IV solvents in which dry cleaning is conducted by the public.

Spotting and pretreating operations conducted in accordance with Section 2106 shall not change the type of the dry cleaning plant.

2103.2.1 Multiple solvents. Dry cleaning plants using more than one class of solvent for dry cleaning shall be classified based on the numerically lowest solvent class.

2103.3 Design. The occupancy classification, design and construction of dry cleaning plants shall comply with the applicable requirements of the *California Building Code*.

SECTION 2104—GENERAL REQUIREMENTS

2104.1 Prohibited use. Type I dry cleaning plants shall be prohibited. Limited quantities of Class I solvents stored and used in accordance with this section shall not be prohibited in dry cleaning plants.

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2104.2 Building services. Building services and systems shall be designed, installed and maintained in accordance with this section and Chapter 6.

2104.2.1 Ventilation. Ventilation shall be provided in accordance with Section 502 of the *California Mechanical Code* and DOL 29 CFR Part 1910.1000, where applicable.

2104.2.2 Heating. In Type II dry cleaning plants, heating shall be by indirect means using steam, hot water or hot oil only.

2104.2.3 Electrical wiring and equipment. Electrical wiring and equipment in dry cleaning rooms or other locations subject to flammable vapors shall be installed in accordance with *the California Electrical Code.*

2104.2.4 Bonding and grounding. Storage tanks, treatment tanks, filters, pumps, piping, ducts, dry cleaning units, stills, tumblers, drying cabinets and other such equipment, where not inherently electrically conductive, shall be bonded together and grounded. Isolated equipment shall be grounded.

SECTION 2105—OPERATING REQUIREMENTS

2105.1 General. The operation of dry cleaning systems shall comply with the requirements of Sections 2105.1.1 through 2105.3.

2105.1.1 Written instructions. Written instructions covering the proper installation and safe operation and use of equipment and solvent shall be given to the buyer.

2105.1.1.1 Type II, III-A, III-B and IV systems. In Type II, III-A, III-B and IV dry cleaning systems, machines shall be operated in accordance with the operating instructions furnished by the machinery manufacturer. Employees shall be instructed as to the hazards involved in their departments and in the work they perform.

2105.1.1.2 Type V systems. Operating instructions for customer use of Type V dry cleaning systems shall be conspicuously posted in a location near the dry cleaning unit. A telephone number shall be provided for emergency assistance.

2105.1.2 Equipment identification. The manufacturer shall provide nameplates on dry cleaning machines indicating the class of solvent for which each machine is designed.

2105.1.3 Open systems prohibited. Dry cleaning by immersion and agitation in open vessels shall be prohibited.

2105.1.4 Prohibited use of solvent. The use of solvents with a flash point below that for which a machine is designed or listed shall be prohibited.

2105.1.5 Equipment maintenance and housekeeping. Proper maintenance and operating practices shall be observed in order to prevent the leakage of solvent or the accumulation of lint. The handling of waste material generated by dry cleaning operations and the maintenance of facilities shall comply with the provisions of this section.

2105.1.5.1 Floors. Class I and II liquids shall not be used for cleaning floors.

2105.1.5.2 Filters. Filter residue and other residues containing solvent shall be handled and disposed of in covered metal containers.

2105.1.5.3 Lint. Lint and refuse shall be removed from traps daily, deposited in approved waste cans, removed from the premises, and disposed of safely. At all other times, traps shall be held securely in place.

2105.1.5.4 Customer areas. In Type V dry cleaning systems, customer areas shall be kept clean.

2105.2 Type II systems. Special operating requirements for Type II dry cleaning systems shall comply with the provisions of Sections 2105.2.1 through 2105.2.3.

2105.2.1 Inspection of materials. Materials to be dry cleaned shall be searched thoroughly and foreign materials, including matches and metallic substances, shall be removed.

2105.2.2 Material transfer. In removing materials from the washer, provisions shall be made for minimizing the dripping of solvent on the floor. Where materials are transferred from a washer to a drain tub, a nonferrous metal drip apron shall be placed so that the apron rests on the drain tub and the cylinder of the washer.

2105.2.3 Ventilation. A mechanical ventilation system that is designed to exhaust 1 cubic foot of air per minute for each square foot of floor area [0.0058 $m^3/(s \times m^2)$] shall be installed in dry cleaning rooms and in drying rooms. The ventilation system shall operate automatically when the dry cleaning equipment is in operation and shall have manual controls at an approved location.

2105.3 Type IV and V systems. Type IV and V dry cleaning systems shall be provided with an automatically activated exhaust ventilation system to maintain an air velocity of not less than 100 feet per minute (0.51 m/s) through the loading door when the door is opened. Such systems for dry cleaning equipment shall comply with the *California Mechanical Code*.

Exception: Dry cleaning units are not required to be provided with exhaust ventilation where an exhaust hood is installed immediately outside of and above the loading door and operates at an airflow rate as follows:

Equation 21-1 $Q = 100 \times A_{LD}$

where:

Q = flow rate exhausted through the hood, cubic feet per minute (m^3/s).

A_{LD} = area of the loading door, square feet (m^2).

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SECTION 2106—SPOTTING AND PRETREATING

2106.1 General. Spotting and pretreating operations and equipment shall comply with the provisions of Sections 2106.2 through 2106.5.

2106.2 Class I solvents. The maximum quantity of Class I solvents permitted at any workstation shall be 1 gallon (4 L). Spotting or prespotting shall be permitted to be conducted with Class I solvents where they are stored in and dispensed from approved safety cans or in sealed DOT-approved metal shipping containers of not more than 1-gallon (4 L) capacity.

2106.2.1 Spotting and prespotting. Spotting and prespotting shall be permitted to be conducted with Class I solvents where dispensed from plastic containers of not more than 1 pint (0.5 L) capacity.

2106.3 Class II and III solvents. Scouring, brushing, and spotting and pretreating shall be permitted to be conducted with Class II or III solvents. The maximum quantity of Class II or III solvents permitted at any workstation shall be 1 gallon (4 L). In other than Group H-2 occupancy, the aggregate quantities of solvents shall not exceed the maximum allowable quantity per control area for use-open system.

2106.3.1 Spotting tables. Scouring, brushing or spotting tables on which articles are soaked in solvent shall have a liquid-tight top with a curb on all sides not less than 1 inch (25 mm) high. The top of the table shall be pitched to ensure thorough draining to a $1^1/_2$-inch (38 mm) drain connected to an approved container.

2106.3.2 Special handling. Where approved, articles that cannot be washed in the usual washing machines are allowed to be cleaned in scrubbing tubs. Scrubbing tubs shall comply with the following:

1. Only Class II or III liquids shall be used.
2. The total amount of solvent used in such open containers shall not exceed 3 gallons (11 L).
3. Scrubbing tubs shall be secured to the floor.
4. Scrubbing tubs shall be provided with permanent $1^1/_2$-inch (38 mm) drains. Such drain shall be provided with a trap and shall be connected to an approved container.

2106.3.3 Ventilation. Scrubbing tubs, scouring, brushing or spotting operations shall be located such that solvent vapors are captured and exhausted by the ventilating system.

2106.3.4 Bonding and grounding. Metal scouring, brushing and spotting tables and scrubbing tubs shall be permanently and effectively bonded and grounded.

2106.4 Type IV systems. Flammable and combustible liquids used for spotting operations shall be stored in approved safety cans or in sealed DOTn-approved shipping containers of not more than 1 gallon (4 L) in capacity. Aggregate amounts shall not exceed 10 gallons (38 L).

2106.5 Type V systems. Spotting operations using flammable or combustible liquids are prohibited in Type V dry cleaning systems.

SECTION 2107—DRY CLEANING SYSTEMS

2107.1 General equipment requirements. Dry cleaning systems, including dry cleaning units, washing machines, stills, drying cabinets, tumblers and their appurtenances, including pumps, piping, valves, filters and solvent coolers, shall be installed and maintained in accordance with NFPA 32. The construction of buildings in which such systems are located shall comply with the requirements of this section and the *California Building Code*.

2107.2 Type II systems. Type II dry cleaning and solvent tank storage rooms shall not be located below grade or above the lowest floor level of the building and shall comply with Sections 2107.2.1 through 2107.2.3.

Exception: Solvent storage tanks installed underground, in vaults or in special enclosures in accordance with Chapter 57.

2107.2.1 Firefighting access. Type II dry cleaning plants shall be located so that access is provided and maintained from one side for firefighting and fire control purposes in accordance with Section 503.

2107.2.2 Number of means of egress. Type II dry cleaning rooms shall have not less than two means of egress doors located at opposite ends of the room, not less than one of which shall lead directly to the outside.

2107.2.3 Spill control and secondary containment. Curbs, drains or other provisions for spill control and secondary containment shall be provided in accordance with Section 5004.2 to collect solvent leakage and fire protection water and direct it to a safe location.

2107.3 Solvent storage tanks. Solvent storage tanks for Class II, IIIA and IIIB liquids shall conform to the requirements of Chapter 57 and be located underground or outside, above ground.

Exception: As provided in NFPA 32 for inside storage or treatment tanks.

SECTION 2108—FIRE PROTECTION

2108.1 General. Where required by this section, fire protection systems, devices and equipment shall be installed, inspected, tested and maintained in accordance with Chapter 9.

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2108.2 Automatic sprinkler system. An automatic sprinkler system shall be installed in accordance with Section 903.3.1.1 throughout dry cleaning plants containing Type II, Type III-A or Type III-B dry cleaning systems.

Exceptions:

1. An automatic sprinkler system shall not be required in Type III-A dry cleaning plants where the aggregate quantity of Class III-A solvent in dry cleaning machines and storage does not exceed 330 gallons (1250 L) and dry cleaning machines are equipped with a feature that will accomplish any one of the following:
    1.1. Prevent oxygen concentrations from reaching 8 percent or more by volume.
    1.2. Keep the temperature of the solvent not less than 30°F (16.7°C) below the flash point.
    1.3. Maintain the solvent vapor concentration at a level lower than 25 percent of the lower explosive limit (LEL).
    1.4. Utilize equipment approved for use in Class I, Division 2, hazardous locations in accordance with *the California Electrical Code*.
    1.5. Utilize an integrated dry-chemical, clean agent or water-mist automatic fire-extinguishing system designed in accordance with Chapter 9.
2. An automatic sprinkler system shall not be required in Type III-B dry cleaning plants where the aggregate quantity of Class III-B solvent in dry cleaning machines and storage does not exceed 3,300 gallons (12 490 L).

2108.3 Automatic fire-extinguishing systems. Type II dry cleaning units, washer-extractors, and drying tumblers in Type II dry cleaning plants shall be provided with an approved automatic fire-extinguishing system installed and maintained in accordance with Chapter 9.

Exception: Where approved, a manual steam jet not less than $^{3}/_{4}$ inch (19 mm) with a continuously available steam supply at a pressure not less than 15 pounds per square inch gauge (psig) (103 kPa) is allowed to be substituted for the automatic fire-extinguishing system.

2108.4 Portable fire extinguishers. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and Section 906. Not fewer than two 2-A:10-B:C portable fire extinguishers shall be provided near the doors inside dry cleaning rooms containing Type II, Type III-A and Type III-B dry cleaning systems.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 22 – COMBUSTIBLE DUST-PRODUCING OPERATIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

22

COMBUSTIBLE DUST-PRODUCING OPERATIONS

User notes:

About this chapter: Chapter 22 provides requirements that seek to reduce the likelihood of dust explosions by managing the hazards of ignitable suspensions of combustible dusts associated with a variety of operations including woodworking, mining, food processing, agricultural commodity storage and handling and pharmaceutical manufacturing, among others. This chapter provides various requirements to control ignition sources, use properly listed and designed dust collection systems, maintain good housekeeping practices and provide proper training to those involved in these processes. Appropriate standards are referenced to deal with the specific dust hazards.

SECTION 2201—GENERAL

2201.1 Scope. The equipment, processes and operations involving dust explosion hazards and use or handling of combustible dust shall comply with the provisions of this chapter.

Exceptions:

1. Storage and use of consumer materials in Group B or R occupancies.
2. Storage and use of commercially packaged materials in Group M occupancies.
3. Materials displayed in original packaging in Group M occupancies and intended as building materials or for personal or household use.
4. Storage of sealed containers of combustible dust at facilities not associated with an operation that uses, handles or generates combustible dust.
5. Materials stored or used in farm buildings or similar occupancies intended for on-premises agricultural purposes.

2201.2 Permits. Permits shall be required for combustible dust-producing operations as set forth in Section 105.5.

SECTION 2202—DEFINITIONS

2202.1 Definition. The following terms are defined in Chapter 2:

COMBUSTIBLE DUST.

DUST COLLECTION SYSTEM.

SECTION 2203—DUST EXPLOSION PREVENTION

2203.1 Critical depth layer. The maximum dust layer on all surfaces, including but not limited to walls, ceilings, beams, equipment, furniture, pipes and ducts, shall not exceed the critical depth layer specified in Table 2203.1. The critical depth layer is permitted to be adjusted for explosion hazard where further evaluated in accordance with one of the following:

1. Section 7.2.1.3 of NFPA 654.
2. Section 4.1.3.3 of NFPA 664 for wood flour.

Accumulated combustible dust shall be collected by one of the methods listed in Section 2203.5.

TABLE 2203.1—CRITICAL DEPTH LAYER

TYPE OF DUST	CRITICAL DEPTH LAYER (INCHES)
Wood flour	$^1/_8$
All other dusts	$^1/_{32}$

For SI: 1 inch = 25.4 mm.

2203.2 Dust-producing and dust-handling equipment. Dust-producing equipment and dust-handling equipment, including but not limited to vacuums, dust collection systems, dryers, mixers, blenders, separators, conveyors, storage containers, silos or other similar devices, shall be listed and shall be maintained in accordance with the manufacturer's recommended standards.

2203.2.1 Signages and markings. Signages and markings shall be provided in accordance with Sections 2203.2.1.1 through 2203.2.1.3.

2203.2.1.1 Deflagration vent discharge area markings. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, the area within the deflagration vent's discharge area shall be marked in an approved manner.

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2203.2.1.2 Caution signs. Signs that read as follows shall be posted near the dust-containing equipment with deflagration vents:

CAUTION: THIS EQUIPMENT CAN CONTAIN EXPLOSIVE DUST.
KEEP OUTSIDE THE MARKED AREA WHILE EQUIPMENT IS OPERATING.

2203.2.1.3 Warning signs. Where dust collection systems and other equipment, systems or system components are provided with deflagration vents, vent closures shall be clearly marked as follows:

WARNING: EXPLOSION RELIEF DEVICE. STAY CLEAR.

2203.3 Dust-collection and dust-conveying systems. Dust-collection and dust-conveying systems shall be in accordance with Sections 2203.3.1 through 2203.3.3.

2203.3.1 Dust-collection systems. Dust-collection systems shall be designed to collect dust emissions from dust-producing equipment at the point of generation. Dust-collection systems shall be in accordance with Section 510 of the *California Mechanical Code*.

Exception: Closed systems using listed equipment and designed in accordance with manufacturer's recommendations and specifications, where cleanouts are provided in accordance with Section 2203.3.3.

Heating, ventilation, and air conditioning (HVAC) systems shall not be used as the means to collect dusts from localized sources.

2203.3.1.1 Location. Dust collectors shall be located outside of buildings.

Exceptions:

1. Dust collectors inside buildings complying with Section 510 of the *California Mechanical Code*.
2. Wet-type dust collectors specifically *listed* for the type of dust conveyed shall be permitted inside buildings where in accordance with the manufacturer's instructions and specifications.
3. Dust collectors designed to specific NFPA standards listed in Table 2205.1 for the specific type of dust conveyed.

2203.3.1.2 Minimum conveying velocities. The minimum velocities within ducts used as part of the dust collection system shall be in accordance with Table 2203.3.1.2.

TABLE 2203.3.1.2—MINIMUM CONVEYING VELOCITIES

TYPE OF PRODUCT	FEET PER MINUTE
Fine light dust such as cotton, lint and wood flour (100 mesh and under)	2,000
Dry dust such as fine rubber molding powder	2,500
Average dust such as sawdust, grinding dust and coal dust	3,500
Heavy dust such as metal turnings, including aluminum and magnesium powder	4,000

For SI: 1 foot per minute = 0.00508 m/s.

2203.3.2 Plastic ducts and conveying systems. Plastic, fiberglass, other nonconductive ducts, duct liners or pipes shall not be used as part of ducts and conveying systems. Ductwork utilizing a combustible lining shall be permitted only in high-impact areas and where approved. Flexible hose shall be permitted if designed and installed in accordance with the following requirements:

1. Manufactured of static dissipative construction.
2. Used only for connections and isolation purposes.
3. Limited to 18 inches (457 mm) in length.
4. Properly grounded.

2203.3.3 Cleanouts. Openings in enclosed equipment and conveyors shall be provided to allow access to all parts of the equipment and conveyors to permit inspection, cleaning, maintenance and the effective use of portable fire extinguishers or hose streams. Cleanouts for ducts used as part of the dust-collection system shall be in accordance with the *California Mechanical Code*.

2203.4 Sources of ignition. Sources of ignition shall be controlled in accordance with Sections 2203.4.1 through 2203.4.9.5.

2203.4.1 Classified electrical. Classified electrical shall be in accordance with *the California Electrical Code*. Electrical motors and electrical components of the equipment shall not be installed in the dust-laden airstream unless listed for Class II, Division 1, locations.

2203.4.2 Static electricity. Bonding and grounding is required to minimize accumulation of static electric charge in the following locations:

1. Dust-producing equipment.
2. Dust-collection system.
3. Pneumatic dust-conveying systems conveying combustible dust from one location to another, combustible dust conveyors, piping and conductive components. Conveying systems include transport modes such as railcars, hopper cars, boxcars, tank cars and trucks into which or from which commodities or products are pneumatically conveyed.
4. Conveying systems using metallic piping.

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2203.4.3 Hot works. Hot work and similar spark-producing operations shall not be conducted in or adjacent to combustible dust-producing areas unless precautions have been taken to provide safety. Hot work shall be permitted only in safe, designated areas in accordance with Chapter 35. Hot work is prohibited on equipment that is operating.

2203.4.3.1 Signs. Conspicuous signs with the following warning shall be posted in the vicinity of combustible dust-producing areas or in the vicinity of combustible dust use:

NO WELDING. THE USE OF WELDING OR CUTTING EQUIPMENT IN OR NEAR THIS AREA IS DANGEROUS BECAUSE OF FIRE AND EXPLOSION HAZARDS.

WELDING AND CUTTING SHALL BE DONE ONLY UNDER THE SUPERVISION OF THE PERSON IN CHARGE.

2203.4.4 Hot surfaces and hot equipment. In areas where a dust explosion hazard or dust flash fire hazard exists, the temperature (in degrees Celsius) of external surfaces shall be maintained below 80 percent of the lower of the dust-surface ignition temperature or the dust-cloud ignition temperature for worst-case dusts. External surfaces shall include but are not limited to:

1. Compressors.
2. Steam, water or process piping.
3. Ducts.
4. Conveyors.
5. Process equipment.

Where steam pipes or hot surfaces occur in dust-producing or dust-handling areas, accumulation of dust on the surfaces shall be minimized by an approved method.

Exception: Drying apparatus listed for the intended use and installed in accordance with the manufacturer's instructions.

2203.4.5 Powered industrial trucks. Powered industrial trucks used in electrically classified areas shall be listed for such use.

2203.4.6 Smoking prohibited. Smoking shall be prohibited in or adjacent to dust-producing or dust-handling areas. "No Smoking" signs complying with Section 310 shall be conspicuously posted in such areas. Smoking shall be permitted only in designated areas.

2203.4.7 Spark-producing devices. S park-producing devices shall not be located within 20 feet (6096 mm) of areas requiring classified electrical unless separated by a permanent partition.

2203.4.8 Self-heating materials. Materials in silos and other large storage piles of particulates prone to self-heating shall be in accordance with Section 9.4.11of NFPA 652.

2203.4.9 Open flames and fuel-fired equipment. Open flames and fuel-fired equipment shall be in accordance with Sections 2203.4.9.1 through 2203.4.9.5.

2203.4.9.1 Release of airborne combustible dust. Production, maintenance or repair activities that have the potential to release or force combustible dust to become airborne shall not be conducted within 35 feet (11 m) of an open flame or pilot flame.

2203.4.9.2 Space heaters. Fuel-fired space heaters drawing local ambient air shall not be located within electrically classified areas. Space-heating appliances in dust-producing or dust-handling areas shall be located where not subject to the accumulation of deposits of combustible dust.

2203.4.9.3 Equipment listing. Fuel-fired process equipment shall be listed for its intended use and shall be operated and maintained in accordance with the manufacturer's instructions.

2203.4.9.4 Inspection and preventive maintenance. Inspection and maintenance of fuel-fired process equipment shall include verification that significant combustible dust accumulations do not exist within or around the equipment.

2203.4.9.5 Sources of combustion air. In Class II electrically classified locations, heating units shall be provided with a source of combustion air ducted directly from the building exterior or from an unclassified location.

2203.5 Housekeeping. Accumulation of combustible dust on surfaces inside buildings shall be maintained below the critical depth layer in Section 2203.1. Pressurized air or similar methods shall not be used to remove dust from surfaces. Accumulated combustible dust shall be collected by one of the following methods:

1. Portable vacuum cleaners listed for use in Class II, Group G, Division 1, atmospheres as defined in *the California Electrical Code*.
2. Dust collection systems.
3. Other approved means that will not place combustible dust into suspension in air.

Exception: Forced-air or similar methods shall be permitted to remove dust in accordance with NFPA 652, NFPA 654 or NFPA 664.

2203.6 Standard operational procedures. Dust-producing equipment and all associated equipment, including dust-collection equipment, shall be maintained in accordance with the manufacturer's instructions and specifications and applicable codes. The inspection, testing and maintenance program shall include the following, as applicable:

1. Fire and explosion protection and prevention equipment, as applicable, in accordance with the appropriate NFPA standards.
2. Dust-control equipment.
3. Control of potential ignition sources.

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4. Electrical, process and mechanical equipment, including applicable process interlocks.
5. Lubrication of bearings for dust-collection, dust-handling and dust-producing equipment.
6. Additional maintenance in accordance with the manufacturer's instructions and specifications for dust-collection, dust-handling and dust-producing equipment.

Records shall be kept of maintenance and repairs performed. The standard operating procedures shall be submitted to the fire code official for review and approval. The written standard operating procedures shall be signed by the person responsible for facility operations.

2203.7 Emergency response plan. A written emergency response plan shall be developed for preventing, preparing for and responding to work-related emergencies, including but not limited to fire and explosion. The following information shall be developed into the plan:

1. Identification of dust hazards.
2. Identification and location of all utilities to affected areas.
3. Site plans or floor plans locating utility shutoff controls, including water, gas and power.
4. The potential for explosion.
5. Locations of fire-extinguishing equipment compatible with the hazards present.
6. Any additional information required by the fire code official.

2203.8 Training. The plans and procedures required in Sections 2203.5, 2203.6 and 2203.7 shall be approved by the fire code official. The plans and procedures shall be reviewed annually and updated as required by process changes. Initial and annual refresher training shall be provided to employees who are involved in operating, maintaining and supervising facilities that handle combustible dust. Initial and annual refresher training shall include:

1. Workplace hazards.
2. General orientation, plant diagrams and plant safety rules.
3. Process description or flowchart.
4. Equipment operation, safe startup and shutdown, and response to hazard conditions or an incident.
5. The location and use of all related fire and explosion protection and prevention systems.
6. Equipment maintenance requirements and practices, including visual inspections of conveyors and ducts.
7. Housekeeping requirements, including the maintenance of the critical depth layer in Section 2203.1.
8. Emergency response plans as required in Section 2203.7.

The employer shall maintain records of initial and annual training and review.

SECTION 2204—DUST EXPLOSION SCREENING TESTS

2204.1 Combustibility and explosivity tests. Where combustibility or explosivity screening tests are required to analyze the combustible dust as part of compliance with Section 104.9 and Section 414.1.3 of the *California Building Code*, they shall be in accordance with Section 5.4 of NFPA 652.

2204.2 Samples. Representative samples for the screening test shall be obtained in accordance with Section 5.5 of NFPA 652.

SECTION 2205—STANDARDS

2205.1 Specific hazards standards. The fire code official is authorized to enforce additional industry- or material-specific provisions of the codes and standards listed in Table 2205.1 to prevent and control dust explosions, as applicable.

TABLE 2205.1—EXPLOSION PROTECTION STANDARDS

STANDARD	SUBJECT
NFPA 61	Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
NFPA 68	Standard on Explosion Protection by Deflagration Venting
NFPA 69	Standard on Explosion Prevention Systems
NFPA 70	National Electrical Code
NFPA 77	Recommended Practice on Static Electricity
NFPA 85	Boiler and Combustion System Hazards Code
NFPA 120	Standard for Fire Prevention and Control in Coal Mines
NFPA 484	Standard for Combustible Metals
NFPA 654	Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids
NFPA 655	Standard for the Prevention of Sulfur Fires and Explosions
NFPA 664	Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

2205.1.1 Dust hazard analysis. If a dust hazard analysis (DHA) is required by the fire code official for new or existing facilities and operations, it shall be in accordance with NFPA 652. The DHA for existing facilities shall be in accordance with Section 7.1.1 of NFPA 652.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 23 – MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
2302.1 TANK IN AN UNDERGROUND AREA			X																				
2303.1.1			X																				
2306.6.2.7			X																				
2306.7.6			X																				

* The California Code of Regulations (CCR), Title 19, Division 1 provisions that are found in the California Fire Code are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

23

MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

User notes:

About this chapter: Chapter 23 sets forth regulations for motor fuel-dispensing stations and repair garages. It addresses both liquid and gaseous motor fuels associated with automotive, marine, aircraft and fleet vehicle motor fuel-dispensing facilities. The repair garage provisions specifically address hazards associated with the different types of fuel used, including flammable and combustible liquids, hydrogen, LPG, LNG and CNG.

SECTION 2301—GENERAL

2301.1 Scope. Automotive motor fuel-dispensing facilities, marine motor fuel-dispensing facilities, fleet vehicle motor fuel-dispensing facilities, aircraft motor-vehicle fuel-dispensing facilities and repair garages shall be in accordance with this chapter and the *California Building Code*, *International Fuel Gas Code* and *California Mechanical Code*. Such operations shall include both those that are open to the public and private operations.

2301.2 Permits. Permits shall be required as set forth in Section 105.5.

2301.3 Construction documents. Construction documents shall be submitted for review and approval prior to the installation or construction of automotive, marine or fleet vehicle motor fuel-dispensing facilities and repair garages in accordance with Section 107.1.

2301.4 Indoor motor fuel-dispensing facilities. Motor fuel-dispensing facilities located inside buildings shall comply with the *California Building Code* and NFPA 30A.

2301.4.1 Protection of floor openings in indoor motor fuel-dispensing facilities. Where motor fuel-dispensing facilities are located inside buildings and the dispensers are located above spaces within the building, openings beneath dispensers shall be sealed to prevent the flow of leaked fuel to lower building spaces.

2301.5 Electrical. Electrical wiring and equipment shall be suitable for the locations in which they are installed and shall comply with Section 603, NFPA 30A and *the California Electrical Code.*

2301.6 Heat-producing appliances. Heat-producing appliances shall be suitable for the locations in which they are installed and shall comply with NFPA 30A and the *International Fuel Gas Code* or the *California Mechanical Code*.

SECTION 2302—DEFINITIONS

2302.1 Definitions. The following terms are defined in Chapter 2:

AIRCRAFT MOTOR-VEHICLE FUEL-DISPENSING FACILITY.

ALCOHOL-BLENDED FUELS.

AUTOMOTIVE MOTOR FUEL-DISPENSING FACILITY.

DISPENSING DEVICE, OVERHEAD TYPE.

FLEET VEHICLE MOTOR FUEL-DISPENSING FACILITY.

LIQUEFIED NATURAL GAS (LNG).

MARINE MOTOR FUEL-DISPENSING FACILITY.

REPAIR GARAGE.

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY.

TANK IN AN UNDERGROUND AREA.

SECTION 2303—LOCATION OF DISPENSING DEVICES

2303.1 Location of dispensing devices. Dispensing devices shall be located as follows:

1. Ten feet (3048 mm) or more from lot lines.
2. Ten feet (3048 mm) or more from buildings having combustible exterior wall surfaces or buildings having noncombustible exterior wall surfaces that are not part of a 1-hour fire-resistance-rated assembly or buildings having combustible overhangs.

   Exception: Canopies constructed in accordance with the *California Building Code* providing weather protection for the fuel islands.
3. Such that all portions of the vehicle being fueled will be on the premises of the motor fuel-dispensing facility.
4. Such that the nozzle, where the hose is fully extended, will not reach within 5 feet (1524 mm) of building openings.
5. Twenty feet (6096 mm) or more from fixed sources of ignition.
6. Such that fuel dispensing is in view of the attendant at attended self-service motor fuel-dispensing facilities, as required by Section 2304.2.4.

2303.1.1 Protection of dispensing devices. *Where dispensing devices are mounted at grade, they shall be protected at each end with a minimum of two concrete filled steel posts, 6 inches (152 mm) in diameter, having a minimum 3-foot-deep (914 mm) footing not less than*

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15 inches (38 mm) in diameter and projecting above grade at a minimum of 3 feet (914 mm) and be located not less than 4 feet (1219 mm) nor more than 5 feet (1524 mm) from fuel dispensers or point-of-sale devices, or equivalent means approved by the fire chief.

2303.2 Emergency disconnect switches. An approved emergency disconnect switch shall be provided at an approved location to stop the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. The emergency disconnect switch for exterior fuel dispensers shall be provided with ready access and shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be provided with ready access and be installed at an approved location. Such devices shall be distinctly labeled as: "EMERGENCY FUEL SHUT-OFF." Signs shall be provided in approved locations.

2303.2.1 Height. The height of the emergency disconnect switch shall be not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) measured vertically, from the floor level to the activating button.

SECTION 2304—DISPENSING OPERATIONS

2304.1 Supervision of dispensing. The dispensing of fuel at motor fuel-dispensing facilities shall be conducted by a qualified attendant or shall be under the supervision of a qualified attendant at all times or shall be in accordance with Section 2304.3.

2304.2 Attended self-service motor fuel-dispensing facilities. Attended self-service motor fuel-dispensing facilities shall comply with Sections 2304.2.1 through 2304.2.5. Attended self-service motor fuel-dispensing facilities shall have not less than one qualified attendant on duty while the facility is open for business. The attendant's primary function shall be to supervise, observe and control the dispensing of fuel. The attendant shall prevent the dispensing of fuel into containers that do not comply with Section 2304.4.1, control sources of ignition, give immediate attention to accidental spills or releases, and be prepared to use fire extinguishers.

2304.2.1 Special-type dispensers. Approved special-dispensing devices and systems such as, but not limited to, card- or coin-operated and remote-preset types, are allowed at motor fuel-dispensing facilities provided that there is not less than one qualified attendant on duty while the facility is open to the public. Remote preset-type devices shall be set in the "off" position while not in use so that the dispenser cannot be activated without the knowledge of the attendant.

2304.2.2 Emergency controls. Approved emergency controls shall be provided in accordance with Section 2303.2.

2304.2.3 Operating instructions. Dispenser operating instructions shall be conspicuously posted in approved locations on every dispenser.

2304.2.4 Obstructions to view. The attendant shall have a direct line of sight to observe fuel-dispensing operations at all times. Obstructions shall not be placed between the dispensing area and the attendant.

Exception: Video monitoring systems shall be permitted to supplement direct line of sight supervision where approved by the fire code official.

2304.2.5 Communications. The attendant shall be able to communicate with persons in the dispensing area at all times. An approved method of communicating with the fire department shall be provided for the attendant.

2304.3 Unattended self-service motor fuel-dispensing facilities. Unattended self-service motor fuel-dispensing facilities shall comply with Sections 2304.3.1 through 2304.3.7.

2304.3.1 General. Where approved, unattended self-service motor fuel-dispensing facilities are allowed. As a condition of approval, the owner or operator shall provide, and be accountable for, daily site visits, regular equipment inspection and maintenance.

2304.3.2 Dispensers. Dispensing devices shall comply with Section 2306.7. Dispensing devices operated by the insertion of coins or currency shall not be used unless approved.

2304.3.3 Emergency controls. Approved emergency controls shall be provided in accordance with Section 2303.2. Emergency controls shall be of a type that is only manually resettable.

2304.3.4 Operating instructions. Dispenser operating instructions shall be conspicuously posted in approved locations on every dispenser and shall indicate the location of the emergency controls required by Section 2304.3.3.

2304.3.5 Emergency procedures. An approved emergency procedures sign, in addition to the signs required by Section 2305.6, shall be posted in a conspicuous location and shall read:

IN CASE OF FIRE, SPILL OR RELEASE

1. USE EMERGENCY PUMP SHUTOFF
2. REPORT THE ACCIDENT!

FIRE DEPARTMENT TELEPHONE NO. _____

FACILITY ADDRESS _____

2304.3.6 Communications. A telephone not requiring a coin to operate or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the fire code official.

2304.3.7 Quantity limits. Dispensing equipment used at unsupervised locations shall comply with one of the following:

1. Dispensing devices shall be programmed or set to limit uninterrupted fuel delivery to 25 gallons (95 L) and require a manual action to resume delivery.
2. The amount of fuel being dispensed shall be limited in quantity by a preprogrammed card as approved.

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2304.4 Dispensing into portable containers. The dispensing of flammable or combustible liquids into portable approved containers shall comply with Sections 2304.4.1 through 2304.4.3.

2304.4.1 Approved containers required. Class I, II and IIIA liquids shall not be dispensed into a portable container unless such container does not exceed a 6-gallon (22.7 L) capacity, is listed or of approved material and construction, and has a tight closure with a screwed or spring-loaded cover so designed that the contents can be dispensed without spilling. Liquids shall not be dispensed into portable or cargo tanks.

2304.4.2 Nozzle operation. A hose nozzle valve used for dispensing Class I liquids into a portable container shall be in compliance with Section 2306.7.6 and be manually held open during the dispensing operation.

2304.4.3 Location of containers being filled. Portable containers shall not be filled while located inside the trunk, passenger compartment or truck bed of a vehicle.

SECTION 2305—OPERATIONAL REQUIREMENTS

2305.1 Tank filling operations for Class I, II or III liquids. Delivery operations to tanks for Class I, II or III liquids shall comply with Sections 2305.1.1 through 2305.1.3 and the applicable requirements of Chapter 57.

2305.1.1 Delivery vehicle location. Where liquid delivery to above-ground storage tanks is accomplished by positive-pressure operation, tank vehicles shall be positioned not less than 25 feet (7620 mm) from tanks receiving Class I liquids and 15 feet (4572 mm) from tanks receiving Class II and IIIA liquids, measured from the tank to the nearest unloading valve on the tank vehicle.

2305.1.2 Tank capacity calculation. The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled, available capacity of such tank by an approved gauging device.

2305.1.3 Tank fill connections. Delivery of flammable liquids to tanks more than 1,000 gallons (3785 L) in capacity shall be made by means of approved liquid- and vapor-tight connections between the delivery hose and tank fill pipe. Where tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

2305.2 Equipment maintenance and inspection. Motor fuel-dispensing facility equipment shall be maintained in proper working order at all times in accordance with Sections 2305.2.1 through 2305.2.5.

2305.2.1 Inspections. Flammable and combustible liquid fuel-dispensing and containment equipment shall be periodically inspected where required by the fire code official to verify that the equipment is in proper working order and not subject to leakage. Records of inspections shall be maintained.

2305.2.2 Repairs and service. The fire code official is authorized to require damaged or unsafe containment and dispensing equipment to be repaired or serviced in an approved manner.

2305.2.3 Dispensing devices. Where maintenance to Class I liquid dispensing devices becomes necessary and such maintenance could allow the accidental release or ignition of liquid, the following precautions shall be taken before such maintenance is begun:

1. Only persons knowledgeable in performing the required maintenance shall perform the work.
2. Electrical power to the dispensing device and pump serving the dispenser shall be shut off at the main electrical disconnect panel.
3. The emergency shutoff valve at the dispenser, where installed, shall be closed.
4. Vehicle traffic and unauthorized persons shall be prevented from coming within 12 feet (3658 mm) of the dispensing device.

2305.2.4 Emergency shutoff valves. Automatic emergency shutoff valves required by Section 2306.7.4 shall be checked not less than once per year by manually tripping the hold-open linkage.

2305.2.5 Leak detectors. Leak detection devices required by Section 2306.7.7.1 shall be checked and tested not less than annually in accordance with the manufacturer's specifications to ensure proper installation and operation.

2305.3 Spill control. Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other approved means.

2305.4 Sources of ignition. Smoking and open flames shall be prohibited in areas where fuel is dispensed. The engines of vehicles being fueled shall be shut off during fueling. Electrical equipment shall be in accordance with *the California Electrical Code*.

2305.5 Fire extinguishers. Approved portable fire extinguishers complying with Section 906 with a minimum rating of 2-A:20-B:C shall be provided and located such that an extinguisher is not more than 75 feet (22 860 mm) from pumps, dispensers or storage tank fill-pipe openings.

2305.6 Warning signs. Warning signs shall be conspicuously posted within sight of each dispenser in the fuel-dispensing area and shall state the following:

1. No smoking.
2. Shut off motor.
3. Discharge your static electricity before fueling by touching a metal surface away from the nozzle.
4. To prevent static charge, do not reenter your vehicle while gasoline is pumping.
5. If a fire starts, do not remove nozzle—back away immediately.

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6. It is unlawful and dangerous to dispense gasoline into unapproved containers.
7. No filling of portable containers in or on a motor vehicle. Place container on ground before filling.

2305.7 Control of brush and debris. Fenced and diked areas surrounding above-ground tanks shall be kept free from vegetation, debris and other material that is not necessary to the proper operation of the tank and piping system.

Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from fuel-handling equipment.

SECTION 2306—FLAMMABLE AND COMBUSTIBLE LIQUID MOTOR FUEL-DISPENSING FACILITIES

2306.1 General. Storage of flammable and combustible liquids shall be in accordance with Chapter 57 and Sections 2306.2 through 2306.6.3.

2306.2 Method of storage. Approved methods of storage for Class I, II and III liquid fuels at motor fuel-dispensing facilities shall be in accordance with Sections 2306.2.1 through 2306.2.6.

2306.2.1 Underground tanks. Underground tanks for the storage of Class I, II and IIIA liquid fuels shall comply with Chapter 57.

2306.2.1.1 Inventory control for underground tanks. Accurate daily inventory records shall be maintained and reconciled on underground fuel storage tanks for indication of possible leakage from tanks and piping. The records shall include records for each product showing daily reconciliation between sales, use, receipts and inventory on hand. Where there is more than one system consisting of tanks serving separate pumps or dispensers for a product, the reconciliation shall be ascertained separately for each tank system. A consistent or accidental loss of product shall be immediately reported to the fire code official.

2306.2.2 Above-ground tanks located inside buildings. Above-ground tanks for the storage of Class I, II and IIIA liquid fuels are allowed to be located in buildings. Such tanks shall be located in special enclosures complying with Section 2306.2.6, in a liquid storage room or a liquid storage warehouse complying with Chapter 57, or shall be listed and labeled as protected above-ground tanks in accordance with UL 2085.

2306.2.3 Above-ground tanks located outdoors, above grade. Above-ground tanks shall not be used for the storage of Class I, II or III liquid motor fuels, except as provided by this section.

1. Above-ground tanks used for outdoor, above-grade storage of Class I liquids shall be listed and labeled as protected above-ground tanks in accordance with UL 2085 and shall be in accordance with Chapter 57. Such tanks shall be located in accordance with Table 2306.2.3.
2. Above-ground tanks used for outdoor, above-grade storage of Class II or IIIA liquids shall be listed and labeled as protected above-ground tanks in accordance with UL 2085 and shall be installed in accordance with Chapter 57. Tank locations shall be in accordance with Table 2306.2.3.

   Exception: Other above-ground tanks that comply with Chapter 57 where approved by the fire code official.
3. Tanks containing fuels shall not exceed 12,000 gallons (45 420 L) in individual capacity or 48,000 gallons (181 680 L) in aggregate capacity. Installations with the maximum allowable aggregate capacity shall be separated from other such installations by not less than 100 feet (30 480 mm).
4. Tanks located at farms, construction projects or rural areas shall comply with Section 5706.2.
5. Above-ground tanks used for outdoor, above-grade storage of Class IIIB liquid motor fuel shall be listed and labeled in accordance with UL 142 or listed and labeled as protected above-ground tanks in accordance with UL 2085 and shall be installed in accordance with Chapter 57. Tank locations shall be in accordance with Table 2306.2.3.

TABLE 2306.2.3—MINIMUM SEPARATION REQUIREMENTS FOR ABOVE-GROUND TANKS

TANK TYPE	INDIVIDUAL TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM NEAREST IMPORTANT BUILDING ON SAME PROPERTY (feet)	MINIMUM DISTANCE FROM NEAREST FUEL DISPENSER (feet)	MINIMUM DISTANCE FROM LOT LINE THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY (feet)	MINIMUM DISTANCE BETWEEN TANKS (feet)
Protected above-ground tanks	Less than or equal to 6,000	5	25[a, c]	15	5	3
	Greater than 6,000	15	25[a, c]	25	15	3
Tanks in vaults	0–20,000	0[b]	0	0[b]	0	Separate compartment required for each tank
Other tanks	All	50	50	100	50	3

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. At fleet vehicle motor fuel-dispensing facilities, a minimum separation distance is not required.

b. Underground vaults shall be located such that they will not be subject to loading from nearby structures, or they shall be designed to accommodate applied loads from existing or future structures that can be built nearby.

c. For Class IIIB liquids in protected above-ground tanks, a minimum separation distance is not required.

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2306.2.4 Above-ground tanks located in above-grade vaults or below-grade vaults. Above-ground tanks used for storage of Class I, II or IIIA liquid motor fuels are allowed to be installed in vaults located above grade or below grade in accordance with Section 5704.2.8 and shall comply with Sections 2306.2.4.1 and 2306.2.4.2. Tanks in above-grade vaults shall also comply with Table 2306.2.3.

2306.2.4.1 Tank capacity limits. Tanks storing Class I and Class II liquids at an individual site shall be limited to a maximum individual capacity of 15,000 gallons (56 775 L) and an aggregate capacity of 48,000 gallons (181 680 L).

2306.2.4.2 Fleet vehicle motor fuel-dispensing facilities. Tanks storing Class II and Class IIIA liquids at a fleet vehicle motor fuel-dispensing facility shall be limited to a maximum individual capacity of 20,000 gallons (75 700 L) and an aggregate capacity of 80,000 gallons (302 800 L).

2306.2.5 Portable tanks. Where approved by the fire code official, portable tanks are allowed to be temporarily used in conjunction with the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles or motorized equipment on premises not normally open to the public. The approval shall include a definite time limit.

2306.2.6 Special enclosures. Where installation of tanks in accordance with Section 5704.2.11 is impractical, or because of property or building limitations, tanks for liquid motor fuels are allowed to be installed in buildings in special enclosures in accordance with all of the following:

1. The special enclosure shall be liquid tight and vapor tight.
2. The special enclosure shall not contain backfill.
3. Sides, top and bottom of the special enclosure shall be of reinforced concrete not less than 6 inches (152 mm) thick, with openings for inspection through the top only.
4. Tank connections shall be piped or closed such that neither vapors nor liquid can escape into the enclosed space between the special enclosure and any tanks inside the special enclosure.
5. Means shall be provided whereby portable equipment can be employed to discharge to the outside any vapors that might accumulate inside the special enclosure should leakage occur.
6. Tanks containing Class I, II or IIIA liquids inside a special enclosure shall not exceed 6,000 gallons (22 710 L) in individual capacity or 18,000 gallons (68 130 L) in aggregate capacity.
7. Each tank within special enclosures shall be surrounded by a clear space of not less than 3 feet (910 mm) to allow for maintenance and inspection.

2306.3 Security. Above-ground tanks for the storage of liquid motor fuels shall be safeguarded from public access or unauthorized entry in an approved manner.

2306.4 Physical protection. Guard posts complying with Section 312 or other approved means shall be provided to protect above-ground tanks against impact by a motor vehicle unless the tank is listed as a protected above-ground tank with vehicle impact protection.

2306.5 Secondary containment. Above-ground tanks shall be provided with drainage control or diking in accordance with Chapter 57. Drainage control and diking is not required for listed secondary containment tanks. Secondary containment systems shall be monitored either visually or automatically. Enclosed secondary containment systems shall be provided with emergency venting in accordance with Section 2306.6.2.5.

2306.6 Piping, valves, fittings and ancillary equipment for use with flammable or combustible liquids. The design, fabrication, assembly, testing and inspection of piping, valves, fittings and ancillary equipment for use with flammable or combustible liquids shall be in accordance with Chapter 57 and Sections 2306.6.1 through 2306.6.3.

2306.6.1 Protection from damage. Piping shall be located such that it is protected from physical damage.

2306.6.2 Piping, valves, fittings and ancillary equipment for above-ground tanks for Class I, II and III liquids. Piping, valves, fittings and ancillary equipment for above-ground tanks storing Class I, II and III liquids shall comply with Sections 2306.6.2.1 through 2306.6.2.6.

2306.6.2.1 Tank openings. Tank openings for above-ground tanks shall be through the top only.

2306.6.2.2 Fill-pipe connections. The fill pipe for above-ground tanks shall be provided with a means for making a direct connection to the tank vehicle's fuel-delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill-hose connection.

2306.6.2.3 Overfill protection. Overfill protection shall be provided for above-ground flammable and combustible liquid storage tanks in accordance with Sections 5704.2.7.5.8 and 5704.2.9.7.5.

2306.6.2.4 Siphon prevention. An approved antisiphon method shall be provided in the piping system to prevent flow of liquid by siphon action.

2306.6.2.5 Emergency relief venting. Above-ground storage tanks, tank compartments and enclosed secondary containment spaces shall be provided with emergency relief venting in accordance with Chapter 57.

2306.6.2.6 Spill containers. A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and

equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container is allowed.

2306.6.2.7 Piping for tanks in underground areas. *Piping systems connected to a tank in an underground area shall also comply with Section 5703.6.2.2.*

2306.6.3 Piping, valves, fittings and ancillary equipment for underground tanks. Piping, valves, fittings and ancillary equipment for underground tanks shall comply with Chapter 57 and NFPA 30A.

2306.7 Fuel-dispensing systems for flammable or combustible liquids. The design, fabrication and installation of fuel-dispensing systems for flammable or combustible liquid fuels shall be in accordance with Sections 2306.7.1 through 2306.7.9.2.4. Alcohol-blended fuel-dispensing systems shall also comply with Section 2306.8.

2306.7.1 Listed equipment. Electrical equipment, dispensers, hose, nozzles and submersible or subsurface pumps used in fuel-dispensing systems shall be listed.

2306.7.2 Fixed pumps required. Class I and II liquids shall be transferred from tanks by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge.

2306.7.3 Mounting of dispensers. Dispensing devices, except those installed on top of a protected above-ground tank that qualifies as vehicle-impact resistant, shall be protected against physical damage by mounting on a concrete island 6 inches (152 mm) or more in height, or shall be protected in accordance with Section 312. Dispensing devices shall be installed and securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions. Dispensing devices installed indoors shall be located in an approved position where they cannot be struck by an out-of-control vehicle descending a ramp or other slope.

2306.7.3.1 Additional impact protection. The fire code official is authorized to require additional impact protection in accordance with Section 312 where dispensing devices are located in areas near parking areas, multiple dispensing devices, highway on- and off-ramps, and other areas where there is a higher potential for vehicle impacts.

2306.7.4 Dispenser emergency shutoff valve. An approved automatic emergency shutoff valve designed to close in the event of a fire or impact shall be properly installed in the liquid supply line at the base of each dispenser supplied by a remote pump. The valve shall be installed so that the shear groove is flush with or within $^{1}/_{2}$ inch (12.7 mm) of the top of the concrete dispenser island and there is clearance provided for maintenance purposes around the valve body and operating parts. The valve shall be installed at the liquid supply line inlet of each overhead-type dispenser. Where installed, a vapor return line located inside the dispenser housing shall have a shear section or approved flexible connector for the liquid supply line emergency shutoff valve to function. Emergency shutoff valves shall be installed and maintained in accordance with the manufacturer's instructions, tested at the time of initial installation and not less than yearly thereafter in accordance with Section 2305.2.4.

2306.7.5 Dispenser hose. Dispenser hoses shall be not more than 18 feet (5486 mm) in length unless otherwise approved. Dispenser hoses shall be listed and approved. When not in use, hoses shall be reeled, racked or otherwise protected from damage.

2306.7.5.1 Emergency breakaway devices. Dispenser hoses for Class I and II liquids shall be equipped with a listed emergency breakaway device designed to retain liquid on both sides of a breakaway point. Such devices shall be installed and maintained in accordance with the manufacturer's instructions. Where hoses are attached to hose-retrieving mechanisms, the emergency breakaway device shall be located between the hose nozzle and the point of attachment of the hose-retrieval mechanism to the hose.

2306.7.6 Fuel delivery nozzles. A listed automatic-closing-type hose nozzle valve with or without a latch-open device shall be provided on island-type dispensers used for dispensing Class I, II or III liquids.

Overhead-type dispensing units shall be provided with a listed automatic-closing-type hose nozzle valve without a latch-open device. *The design of the system shall be such that the hose nozzle valve will close automatically in the event the valve is released from a fill opening or upon impact with a driveway.*

Any latch-open device determined to be inoperative by the fire code official shall be repaired or replaced within 48 hours after notification.

Exception: A listed automatic-closing-type hose nozzle valve with latch-open device is allowed to be used on overhead-type dispensing units where the design of the system is such that the hose nozzle valve will close automatically in the event the valve is released from a fill opening or upon impact with a driveway.

2306.7.6.1 Special requirements for nozzles. Where dispensing of Class I, II or III liquids is performed, a listed automatic-closing-type hose nozzle valve shall be used incorporating all of the following features:

1. The hose nozzle valve shall be equipped with an integral latch-open device.
2. Where the flow of product is normally controlled by devices or equipment other than the hose nozzle valve, the hose nozzle valve shall not be capable of being opened unless the delivery hose is pressurized. If pressure to the hose is lost, the nozzle shall close automatically.

   Exception: Vapor recovery nozzles incorporating insertion interlock devices designed to achieve shutoff on disconnect from the vehicle fill pipe.
3. The hose nozzle shall be designed such that the nozzle is retained in the fill pipe during the filling operation.
4. The system shall include listed equipment with a feature that causes or requires the closing of the hose nozzle valve before the product flow can be resumed or before the hose nozzle valve can be replaced in its normal position in the dispenser.

2306.7.7 Remote pumping systems. Remote pumping systems for liquid fuels shall comply with Sections 2306.7.7.1 and 2306.7.7.2.

2306.7.7.1 Leak detection. Where remote pumps are used to supply fuel dispensers, each pump shall have installed on the discharge side a *listed* leak detection device that will detect a leak in the piping and dispensers and provide an indication. A leak detection device is not required if the piping from the pump discharge to under the dispenser is above ground and visible.

2306.7.7.2 Location. Remote pumps installed above grade, outside of buildings, shall be located not less than 10 feet (3048 mm) from lines of adjoining property that can be built on and not less than 5 feet (1524 mm) from any building opening. Where an outside pump location is impractical, pumps are permitted to be installed inside buildings as provided for dispensers in Section 2301.4 and Chapter 57. Pumps shall be substantially anchored and protected against physical damage.

2306.7.8 Gravity and pressure dispensing. Flammable liquids shall not be dispensed by gravity from tanks, drums, barrels or similar containers. Flammable or combustible liquids shall not be dispensed by a device operating through pressure within a storage tank, drum or container.

2306.7.9 Vapor-recovery and vapor-processing systems. Vapor-recovery and vapor-processing systems shall be in accordance with Sections 2306.7.9.1 through 2306.7.9.2.4.

2306.7.9.1 Vapor-balance systems. Vapor-balance systems shall comply with Sections 2306.7.9.1.1 through 2306.7.9.1.5.

2306.7.9.1.1 Dispensing devices. Dispensing devices incorporating provisions for vapor recovery shall be listed and labeled. Where existing listed or labeled dispensing devices are modified for vapor recovery, such modifications shall be listed by report by a nationally recognized testing laboratory. The listing by report shall contain a description of the component parts used in the modification and recommended method of installation on specific dispensers. Such report shall be made available on request of the fire code official.

Means shall be provided to shut down fuel dispensing in the event the vapor return line becomes blocked.

2306.7.9.1.2 Vapor-return line closeoff. An acceptable method shall be provided to close off the vapor return line from dispensers when the product is not being dispensed.

2306.7.9.1.3 Piping. Piping in vapor-balance systems shall be in accordance with Sections 5703.6, 5704.2.9 and 5704.2.11. Nonmetallic piping shall be installed in accordance with the manufacturer's instructions.

Existing and new vent piping shall be in accordance with Sections 5703.6 and 5704.2. Vapor return piping shall be installed in a manner that drains back to the tank, without sags or traps in which liquid can become trapped. If necessary, because of grade, condensate tanks are allowed in vapor return piping. Condensate tanks shall be designed and installed so that they can be drained without opening.

2306.7.9.1.4 Flexible joints and shear joints. Flexible joints shall be installed in accordance with Section 5703.6.9.

An approved shear joint shall be rigidly mounted and connected by a union in the vapor return piping at the base of each dispensing device. The shear joint shall be mounted flush with the top of the surface on which the dispenser is mounted.

2306.7.9.1.5 Testing. Vapor return lines and vent piping shall be tested in accordance with Section 5703.6.3.

2306.7.9.2 Vapor-processing systems. Vapor-processing systems shall comply with Sections 2306.7.9.2.1 through 2306.7.9.2.4.

2306.7.9.2.1 Equipment. Equipment in vapor-processing systems, including hose nozzle valves, vapor pumps, flame arresters, fire checks or systems for prevention of flame propagation, controls and vapor-processing equipment, shall be individually listed for the intended use in a specified manner.

Vapor-processing systems that introduce air into the underground piping or storage tanks shall be provided with equipment for prevention of flame propagation that has been tested and listed as suitable for the intended use.

2306.7.9.2.2 Location. Vapor-processing equipment shall be located at or above grade. Sources of ignition shall be located not less than 50 feet (15 240 mm) from fuel-transfer areas and not less than 18 inches (457 mm) above tank fill openings and tops of dispenser islands. Vapor-processing units shall be located not less than 10 feet (3048 mm) from the nearest building or lot line of a property that can be built on.

Exception: Where the required distances to buildings, lot lines or fuel-transfer areas cannot be obtained, means shall be provided to protect equipment against fire exposure. Acceptable means shall include but not be limited to either of the following:

1. Approved protective enclosures, which extend not less than 18 inches (457 mm) above the equipment, constructed of fire-resistant or noncombustible materials.
2. Fire protection using an approved water-spray system.

2306.7.9.2.2.1 Distance from dispensing devices. Vapor-processing equipment shall be located not less than 20 feet (6096 mm) from dispensing devices.

2306.7.9.2.2.2 Physical protection. Vapor-processing equipment shall be protected against physical damage by guardrails, curbs, protective enclosures or fencing. Where approved protective enclosures are used, approved means shall be provided to ventilate the volume within the enclosure to prevent pocketing of flammable vapors.

2306.7.9.2.2.3 Downslopes. Where a downslope exists toward the location of the vapor-processing unit from a fuel-transfer area, the fire code official is authorized to require additional separation by distance and height.

2306.7.9.2.3 Installation. Vapor-processing units shall be securely mounted on concrete, masonry or structural steel supports on concrete or other noncombustible foundations. Vapor-recovery and vapor-processing equipment is allowed to be installed on roofs where approved.

2306.7.9.2.4 Piping. Piping in a mechanical-assist system shall be in accordance with Section 5703.6.

2306.8 Alcohol-blended fuel-dispensing operations. The design, fabrication and installation of alcohol-blended fuel-dispensing systems shall be in accordance with Section 2306.7 and Sections 2306.8.1 through 2306.8.6.

2306.8.1 Listed equipment. Dispensers shall be listed in accordance with UL 87A. Hoses, nozzles, breakaway fittings, swivels, flexible connectors or dispenser emergency shutoff valves, vapor recovery systems, leak detection devices and pumps used in alcohol-blended fuel-dispensing systems shall be listed for the specific purpose.

2306.8.2 Compatibility. Dispensers shall be used only with the fuels for which they have been listed and that are marked on the product. Field-installed components including hose assemblies, breakaway fittings, swivel connectors and hose nozzle valves shall be provided in accordance with the listing and the marking on the unit.

2306.8.3 Change of system contents. Fuel-dispensing systems subject to change in contents from gasoline to alcohol-blended fuels shall be subject to fire code official review and approval prior to commencing dispensing operations.

2306.8.4 Facility identification. Facilities dispensing alcohol-blended fuels shall be identified by an approved means.

2306.8.5 Marking. Dispensers shall be marked in an approved manner to identify the types of alcohol-blended fuels to be dispensed.

2306.8.6 Maintenance and inspection. Equipment shall be maintained and inspected in accordance with Section 2305.2.

SECTION 2307—LIQUEFIED PETROLEUM GAS MOTOR FUEL-DISPENSING FACILITIES

2307.1 General. Motor fuel-dispensing facilities for liquefied petroleum gas (LP-gas) fuel shall be in accordance with this section and Chapter 61.

2307.2 Approvals. Storage vessels and equipment used for the storage or dispensing of LP-gas shall be approved or listed in accordance with Sections 2307.2.1 and 2307.2.2.

2307.2.1 Approved equipment. Containers, pressure relief devices (including pressure relief valves), pressure regulators and piping for LP-gas shall be approved.

2307.2.2 Listed equipment. Hoses, hose connections, vehicle fuel connections, dispensers, LP-gas pumps and electrical equipment used for LP-gas shall be listed.

2307.3 Attendants. Motor fuel-dispensing operations for LP-gas shall be conducted by qualified attendants or in accordance with Section 2307.7 by persons trained in the proper handling of LP-gas.

2307.4 Location of dispensing operations and equipment. The point of transfer for LP-gas dispensing operations shall be separated from buildings and other exposures in accordance with the following:

1. Not less than 25 feet (7620 mm) from buildings where the exterior wall is not part of a fire-resistance-rated assembly having a rating of 1 hour or greater.
2. Not less than 25 feet (7620 mm) from combustible overhangs on buildings, measured from a vertical line dropped from the face of the overhang at a point nearest the point of transfer.
3. Not less than 25 feet (7620 mm) from the lot line of property that can be built on.
4. Not less than 25 feet (7620 mm) from the centerline of the nearest mainline railroad track.
5. Not less than 10 feet (3048 mm) from public streets, highways, thoroughfares, sidewalks and driveways.
6. Not less than 10 feet (3048 mm) from buildings where the exterior wall is part of a fire-resistance-rated assembly having a rating of 1 hour or greater.

Exception: The point of transfer for LP-gas dispensing operations need not be separated from canopies that are constructed in accordance with the *California Building Code* and that provide weather protection for the dispensing equipment.

LP-gas containers shall be located in accordance with Chapter 61. LP-gas storage and dispensing equipment shall be located outdoors.

2307.5 Additional requirements for LP-gas dispensers and equipment. LP-gas dispensers and related equipment shall comply with the following provisions:

1. Pumps shall be fixed in place and shall be designed to allow control of the flow and to prevent leakage and accidental discharge.
2. Dispensing devices installed within 10 feet (3048 mm) of where vehicle traffic occurs shall be protected against physical damage by mounting on a concrete island 6 inches (152 mm) or more in height, or shall be protected in accordance with Section 312.
3. Dispensing devices shall be securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions.

2307.6 Installation of LP-gas dispensing devices and equipment. The installation and operation of LP-gas dispensing systems shall be in accordance with Sections 2307.6.1 through 2307.6.4 and Chapter 61. LP-gas dispensers and dispensing stations shall be installed in accordance with the manufacturer's specifications and their listing.

2307.6.1 Product control valves. The dispenser system piping shall be protected from uncontrolled discharge in accordance with the following:

1. Where mounted on a concrete base, a means shall be provided and installed within $^1/_2$ inch (12.7 mm) of the top of the concrete base that will prevent flow from the supply piping in the event that the dispenser is displaced from its mounting.
2. A manual shutoff valve and an excess flow-control check valve shall be located in the liquid line between the pump and the dispenser inlet where the dispensing device is installed at a remote location and is not part of a complete storage and dispensing unit mounted on a common base.
3. An excess flow-control check valve or an emergency shutoff valve shall be installed in or on the dispenser at the point at which the dispenser hose is connected to the liquid piping.
4. A listed automatic-closing type hose nozzle valve with or without a latch-open device shall be provided on island-type dispensers.

2307.6.2 Hoses. Hoses and piping for the dispensing of LP-gas shall be provided with hydrostatic relief valves. The hose length shall not exceed 18 feet (5486 mm). An approved method shall be provided to protect the hose against mechanical damage.

2307.6.3 Emergency breakaway devices. Dispenser hoses shall be equipped with a listed emergency breakaway device designed to retain liquid on both sides of the breakaway point. Where hoses are attached to hose-retrieving mechanisms, the emergency breakaway device shall be located such that the breakaway device activates to protect the dispenser from being displaced.

2307.6.4 Vehicle impact protection. Where installed within 10 feet of vehicle traffic, LP-gas storage containers, pumps and dispensers shall be protected in accordance with Section 2307.5, Item 2.

2307.7 Public fueling of motor vehicles. Self-service LP-gas dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted containers providing fuel to the LP-gas powered vehicle.

The requirements for self-service LP-gas dispensing systems shall be in accordance with the following:

1. The arrangement and operation of the transfer of product into a vehicle shall be in accordance with this section and Chapter 61.
2. The system shall be provided with an emergency shutoff switch located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, dispensers.
3. The owner of the LP-gas motor fuel-dispensing facility or the owner's designee shall provide for the safe operation of the system and the training of users.
4. The dispenser and hose-end valve shall release not more than $^1/_8$ fluid ounce (4 cc) of liquid to the atmosphere upon breaking the connection with the fill valve on the vehicle.
5. Portable fire extinguishers shall be provided in accordance with Section 2305.5.
6. Warning signs shall be provided in accordance with Section 2305.6.
7. The area around the dispenser shall be maintained in accordance with Section 2305.7.

2307.8 Overfilling. LP-gas containers shall not be filled with LP-gas in excess of the volume determined using the fixed maximum liquid level gauge installed on the container, the volume determined by the overfilling prevention device installed on the container or the weight determined by the required percentage of the water capacity marked on the container.

SECTION 2308—COMPRESSED NATURAL GAS MOTOR FUEL-DISPENSING FACILITIES

2308.1 General. Motor fuel-dispensing facilities for compressed natural gas (CNG) fuel shall be in accordance with this section, Chapter 53 and Section 413 of the *International Fuel Gas Code*.

2308.2 Approvals. Storage vessels and equipment used for the storage, compression or dispensing of CNG shall be approved or listed in accordance with Sections 2308.2.1 through 2308.2.4.

2308.2.1 Approved equipment. Containers, compressors, pressure relief devices (including pressure relief valves), and pressure regulators and piping used for CNG shall be approved.

2308.2.2 Listed equipment. Hoses, hose connections, dispensers and electrical equipment used for CNG shall be listed. Vehicle-fueling connections shall be listed and labeled.

2308.2.3 Residential fueling appliance (RFA). Residential fueling appliances shall be listed and installed in accordance with the installation requirements of CSA/ANSI NGV 5.1, manufacturer's installation instructions and Section 413 of the *International Fuel Gas Code*. The capacity of an RFA shall not exceed 5 cubic feet per minute (0.14 m^3/min) of natural gas.

2308.2.4 Vehicle fueling appliance (VFA). Nonresidential fueling appliances shall be listed and installed in accordance with the installation requirements of CSA/ANSI NGV 5.2, manufacturer's installation instructions and the requirements of Section 413 of the *International Fuel Gas Code* for VFAs. The capacity of the VFA shall not exceed 10 cubic feet per minute (0.28 m^3/min) of natural gas.

2308.3 Location of dispensing operations and equipment. Compression, storage and dispensing equipment shall be located above ground, outdoors.

Exceptions:

1. Compression, storage or dispensing equipment shall be allowed in buildings of noncombustible construction, as set forth in the *California Building Code*, that are unenclosed for three-quarters or more of the perimeter.
2. Compression, storage and dispensing equipment shall be allowed indoors or in vaults in accordance with Chapter 53.

2308.3.1 Location on property. In addition to the requirements of Section 2303.1, compression, storage and dispensing equipment not located in vaults complying with Chapter 53 shall be installed as follows:

1. Not beneath power lines.
2. Ten feet (3048 mm) or more from the nearest building or lot line that could be built on, public street, sidewalk or source of ignition.

   Exception: Dispensing equipment need not be separated from canopies that are constructed in accordance with the *California Building Code* and that provide weather protection for the dispensing equipment.
3. Twenty-five feet (7620 mm) or more from the nearest rail of any railroad track and 50 feet (15 240 mm) or more from the nearest rail of any railroad main track or any railroad or transit line where power for train propulsion is provided by an outside electrical source, such as third rail or overhead catenary.
4. Fifty feet (15 240 mm) or more from the vertical plane below the nearest overhead wire of a trolley bus line.

2308.4 Private fueling of motor vehicles. Self-service CNG-dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted fuel containers on CNG-powered vehicles.

In addition to the requirements in Section 2305, the owner of a self-service CNG motor fuel-dispensing facility shall ensure the safe operation of the system and the training of users.

2308.5 Pressure regulators. Pressure regulators shall be designed and installed or protected so that their operation will not be affected by the elements (freezing rain, sleet, snow or ice), mud or debris. The protection is allowed to be an integral part of the regulator.

2308.6 Valves. Gas piping to equipment shall be provided with a remote, manual shutoff valve that is provided with ready access.

2308.7 Emergency shutdown control. An emergency shutdown control shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, dispensers and shall be provided in the compressor area. Upon activation, the emergency shutdown system shall automatically shut off the power supply to the compressor and close valves between the main gas supply and the compressor and between the storage containers and dispensers.

2308.8 Discharge of CNG from motor vehicle fuel storage containers. The discharge of CNG from motor vehicle fuel cylinders for the purposes of maintenance, cylinder certification, calibration of dispensers or other activities shall be in accordance with Sections 2308.8.1 through 2308.8.1.2.6.

2308.8.1 Methods of discharge. The discharge of CNG from motor vehicle fuel cylinders shall be accomplished through a closed transfer system in accordance with Section 2308.8.1.1 or an approved method of atmospheric venting in accordance with Section 2308.8.1.2.

2308.8.1.1 Closed transfer system. A documented procedure that explains the logical sequence for discharging the cylinder shall be provided to the fire code official for review and approval. The procedure shall include what actions the operator will take in the event of a low-pressure or high-pressure natural gas release during the discharging activity. A drawing illustrating the arrangement of piping, regulators and equipment settings shall be provided to the fire code official for review and approval. The drawing shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the compressor, storage vessels and emergency shutdown devices.

2308.8.1.2 Atmospheric venting. Atmospheric venting of CNG shall comply with Sections 2308.8.1.2.1 through 2308.8.1.2.6.

2308.8.1.2.1 Plans and specifications. A drawing illustrating the location of the vessel support, piping, the method of grounding and bonding, and other requirements specified herein shall be provided to the fire code official for review and approval.

2308.8.1.2.2 Cylinder stability. A method of rigidly supporting the vessel during the venting of CNG shall be provided. The selected method shall provide not less than two points of support and shall prevent the horizontal and lateral movement of the vessel. The system shall be designed to prevent the movement of the vessel based on the highest gas-release velocity through valve orifices at the vessel's rated pressure and volume. The structure or appurtenance shall be constructed of noncombustible materials.

2308.8.1.2.3 Separation. The structure or appurtenance used for stabilizing the cylinder shall be separated from the site equipment, features and exposures and shall be located in accordance with Table 2308.8.1.2.3.

TABLE 2308.8.1.2.3—SEPARATION DISTANCE FOR ATMOSPHERIC VENTING OF CNG	
EQUIPMENT OR FEATURE	**MINIMUM SEPARATION (feet)**
Buildings	25
Building openings	25
CNG compressor and storage vessels	25
CNG dispensers	25
Lot lines	15
Public ways	15
Vehicles	25
For SI: 1 foot = 304.8 mm.	

2308.8.1.2.4 Grounding and bonding. The structure or appurtenance used for supporting the cylinder shall be grounded in accordance with *the California Electrical Code.* The cylinder valve shall be bonded prior to the commencement of venting operations.

2308.8.1.2.5 Vent tube. A vent tube that will divert the gas flow to the atmosphere shall be installed on the cylinder prior to commencement of the venting and purging operation. The vent tube shall be constructed of pipe or tubing materials approved for use with CNG in accordance with Chapter 53.

The vent tube shall be capable of dispersing the gas not less than 10 feet (3048 mm) above grade level. The vent tube shall not be provided with a rain cap or other feature that would limit or obstruct the gas flow.

At the connection fitting of the vent tube and the CNG cylinder, a listed bidirectional detonation flame arrester shall be provided.

2308.8.1.2.6 Signage. Approved "No Smoking" signs complying with Section 310 shall be posted within 10 feet (3048 mm) of the cylinder support structure or appurtenance. Approved "Cylinder Shall Be Bonded" signs shall be posted on the cylinder support structure or appurtenance.

SECTION 2309—HYDROGEN MOTOR FUEL-DISPENSING AND GENERATION FACILITIES

2309.1 General. Hydrogen motor fuel-dispensing and generation facilities shall be in accordance with this section, Chapter 58 and NFPA 2. Where a fuel-dispensing facility includes a repair garage, the repair operation shall comply with Section 2311.

2309.2 Equipment. Equipment used for the generation, compression, storage or dispensing of hydrogen shall be designed for the specific application in accordance with Sections 2309.2.1 through 2309.2.3.

2309.2.1 Approved equipment. Cylinders, containers and tanks; pressure relief devices, including pressure valves; hydrogen vaporizers; pressure regulators; and piping used for gaseous hydrogen systems shall be designed and constructed in accordance with Chapters 53, 55 and 58.

2309.2.2 Listed or approved equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers, motor-fueling connections and electrical equipment used for hydrogen shall be listed or approved for use with hydrogen.

2309.2.3 Electrical equipment. Electrical installations shall be in accordance with *the California Electrical Code*.

2309.3 Location on property. In addition to the requirements of Section 2303.1, dispensing equipment shall be located in accordance with Sections 2309.3.1 through Section 2309.3.2.

2309.3.1 Location of operations and equipment. Generation, compression, storage and dispensing equipment shall be located in accordance with Sections 2309.3.1.1 through 2309.3.1.5.5.

2309.3.1.1 Outdoors. Generation, compression or storage equipment shall be allowed outdoors in accordance with Chapter 58 and NFPA 2.

2309.3.1.2 Indoors. Generation, compression, storage and dispensing equipment shall be located in indoor rooms or areas constructed in accordance with the requirements of the *California Building Code*, the *International Fuel Gas Code*, the *California Mechanical Code* and NFPA 2.

2309.3.1.2.1 Maintenance. Gaseous hydrogen systems and detection devices shall be maintained in accordance with the manufacturer's instructions.

2309.3.1.2.2 Smoking. Smoking shall be prohibited in hydrogen cutoff rooms. "No Smoking" signs shall be provided at all entrances to hydrogen fuel gas rooms.

2309.3.1.2.3 Ignition source control. Open flames, flame-producing devices and other sources of ignition shall be controlled in accordance with Chapter 58.

2309.3.1.2.4 Housekeeping. Hydrogen fuel gas rooms shall be kept free from combustible debris and storage.

2309.3.1.3 Gaseous hydrogen storage. Storage of gaseous hydrogen shall be in accordance with Chapters 53 and 58.

2309.3.1.4 Liquefied hydrogen storage. Storage of liquefied hydrogen shall be in accordance with Chapters 55 and 58.

2309.3.1.5 Canopy tops. Gaseous hydrogen compression and storage equipment located on top of motor fuel-dispensing facility canopies shall be in accordance with Sections 2309.3.1.5.1 through 2309.3.1.5.5, Chapters 53 and 58, and the *International Fuel Gas Code*.

2309.3.1.5.1 Construction. Canopies shall be constructed in accordance with the motor fuel-dispensing facility canopy requirements of Section 406.7 of the *California Building Code*.

2309.3.1.5.2 Fire-extinguishing systems. Fuel-dispensing areas under canopies shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The design of the sprinkler system shall be not less than that required for Extra Hazard Group 2 occupancies. Operation of the sprinkler system shall activate the emergency functions of Sections 2309.3.1.5.3 and 2309.3.1.5.4.

2309.3.1.5.3 Emergency discharge. Operation of the automatic sprinkler system shall activate an automatic emergency discharge system, which will discharge the hydrogen gas from the equipment on the canopy top through the vent pipe system.

2309.3.1.5.4 Emergency shutdown control. Operation of the automatic sprinkler system shall activate the emergency shutdown control required by Section 2309.5.3.

2309.3.1.5.5 Signage. Approved signage having 2-inch (51 mm) block letters shall be affixed at approved locations on the exterior of the canopy structure stating: "CANOPY TOP HYDROGEN STORAGE."

2309.3.2 Canopies. Dispensing equipment need not be separated from canopies of Type I or II construction that are constructed in a manner that prevents the accumulation of hydrogen gas and in accordance with Section 406.7 of the *California Building Code*.

2309.4 Dispensing into motor vehicles at hydrogen motor fuel-dispensing facilities. Hydrogen motor fuel-dispensing systems, including key, code and card lock dispensing systems, shall be limited to the filling of permanently mounted motor vehicle fuel tanks on hydrogen-powered vehicles.

In addition to the requirements in Section 2311, the owner of a hydrogen motor fuel-dispensing facility shall provide for the safe operation of the system by complying with this code and the fueling protocols in NFPA 2 and through the institution of a fire safety plan submitted in accordance with Section 404, the training of employees and operators who use and maintain the system in accordance with Section 406, and provisions for hazard communication in accordance with Section 407.

Exception: Filling of nonpermanently mounted storage containers or tanks for motor fuel-dispensing system testing purposes is permitted.

2309.4.1 Dispensing systems. Dispensing systems shall be equipped with an overpressure protection device set at not greater than 140 percent of the service pressure of the fueling nozzle it supplies.

2309.5 Safety precautions. Safety precautions at hydrogen motor fuel-dispensing and generation facilities shall be in accordance with Sections 2309.5.1 through 2309.5.3.1.

2309.5.1 Protection from vehicles. Guard posts or other approved means shall be provided to protect hydrogen storage systems and use areas subject to vehicular damage in accordance with Section 312.

2309.5.1.1 Vehicle fueling pad. The vehicle shall be fueled on noncoated concrete or other approved paving material having a resistance not exceeding 1 megohm as determined by the methodology specified in EN 1081.

2309.5.2 Emergency shutoff valves. A manual emergency shutoff valve shall be provided to shut down the flow of gas from the hydrogen supply to the piping system.

2309.5.2.1 Identification. Manual emergency shutoff valves shall be identified and the location shall be clearly visible, have access and be indicated by means of a sign.

2309.5.3 Emergency shutdown controls. In addition to the manual emergency shutoff valve required by Section 2309.5.2, a remotely located, manually activated emergency shutdown control shall be provided. An emergency shutdown control shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, dispensers and hydrogen generators.

2309.5.3.1 System requirements. Activation of the emergency shutdown control shall automatically shut off the power supply to all hydrogen storage, compression and dispensing equipment; shut off natural gas or other fuel supply to the hydrogen generator; and close valves between the main supply and the compressor and between the storage containers and dispensing equipment.

2309.6 Repairs, purging, defueling and discharge. The repair, purging, defueling or discharge activities associated with hydrogen motor fuel-dispensing and generation systems, storage tanks and the installation of the systems shall be in accordance with Chapters 53 and 58 and NFPA 2.

Exception: The motor vehicle fuel tank and the fuel supply piping from the motor vehicle fuel tank to the engine compartment on a motor vehicle or forklift unless the fuel tank is required to be defueled in accordance with Section 2311.8.11.

2309.6.1 Documented procedure. A documented procedure that explains the logic sequence for defueling or discharging operations shall be maintained on-site and shall be provided to the fire code official upon request. The procedure shall include what actions the operator is required to take in the event of a low-pressure or high-pressure hydrogen release during discharging activity. Schematic design documents shall be maintained on-site, illustrating the arrangement of piping, regulators and equipment

settings. The schematic shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the vehicle being defueled and, if applicable, to the compressor, storage vessels and emergency shutdown devices.

SECTION 2310—MARINE MOTOR FUEL-DISPENSING FACILITIES

2310.1 General. The construction of marine motor fuel-dispensing facilities shall be in accordance with the *California Building Code* and NFPA 30A. The storage of Class I, II or IIIA liquids at marine motor fuel-dispensing facilities shall be in accordance with this chapter and Chapter 57.

2310.2 Storage and handling. The storage and handling of Class I, II or IIIA liquids at marine motor fuel-dispensing facilities shall be in accordance with Sections 2310.2.1 through 2310.2.3.

2310.2.1 Class I, II or IIIA liquid storage. Class I, II or IIIA liquids stored inside buildings used for marine motor fuel-dispensing facilities shall be stored in approved containers or portable tanks. Storage of Class I liquids shall not exceed 10 gallons (38 L).

Exception: Storage in liquid storage rooms in accordance with Section 5704.3.7.

2310.2.2 Class II or IIIA liquid storage and dispensing. Class II or IIIA liquids stored or dispensed inside buildings used for marine motor fuel-dispensing facilities shall be stored in and dispensed from approved containers or portable tanks. Storage of Class II and IIIA liquids shall not exceed 120 gallons (454 L).

2310.2.3 Heating equipment. Heating equipment installed in Class I, II or IIIA liquid storage or dispensing areas shall comply with Section 2301.6.

2310.3 Dispensing. The dispensing of liquid fuels at marine motor fuel-dispensing facilities shall comply with Sections 2310.3.1 through 2310.3.5.

2310.3.1 General. Wharves, piers or floats at marine motor fuel-dispensing facilities shall be used exclusively for the dispensing or transfer of petroleum products to or from marine craft, except that transfer of essential ship stores is allowed.

2310.3.2 Supervision. Marine motor fuel-dispensing facilities shall have an attendant or supervisor who is fully aware of the operation, mechanics and hazards inherent to fueling of boats on duty whenever the facility is open for business. The attendant's primary function shall be to supervise, observe and control the dispensing of Class I, II or IIIA liquids or flammable gases.

2310.3.3 Hoses and nozzles. Dispensing of Class I, II or IIIA liquids into the fuel tanks of marine craft shall be by means of an approved-type hose equipped with a listed automatic-closing nozzle without a latch-open device.

Hoses used for dispensing or transferring Class I, II or IIIA liquids, when not in use, shall be reeled, racked or otherwise protected from mechanical damage.

2310.3.4 Portable containers. Dispensing of Class I, II or IIIA liquids into containers, other than fuel tanks, shall be in accordance with Section 2304.4.1.

2310.3.5 Liquefied petroleum gas. Liquefied petroleum gas cylinders shall not be filled at marine motor fuel-dispensing facilities unless approved. Approved storage facilities for LP-gas cylinders shall be provided. See also Section 2307.

2310.4 Fueling of marine vehicles at other than approved marine motor fuel-dispensing facilities. Fueling of floating marine craft at other than a marine motor fuel-dispensing facility shall comply with Sections 2310.4.1 and 2310.4.2.

2310.4.1 Class I liquid fuels. Fueling of floating marine craft with Class I fuels at other than a marine motor fuel-dispensing facility is prohibited.

2310.4.2 Class II or III liquid fuels. Fueling of floating marine craft with Class II or III fuels at other than a marine motor fuel-dispensing facility shall be in accordance with all of the following:

1. The premises and operations shall be approved by the fire code official.
2. Tank vehicles and fueling operations shall comply with Section 5706.6.
3. The dispensing nozzle shall be of the listed automatic-closing type without a latch-open device.
4. Nighttime deliveries shall be made only in lighted areas.
5. The tank vehicle flasher lights shall be in operation while dispensing.
6. Fuel expansion space shall be left in each fuel tank to prevent overflow in the event of temperature increase.

2310.5 Fire prevention regulations. General fire safety regulations for marine motor fuel-dispensing facilities shall comply with Sections 2310.5.1 through 2310.5.7.

2310.5.1 Housekeeping. Marine motor fuel-dispensing facilities shall be maintained in a neat and orderly manner. Accumulations of rubbish or waste oils in excessive amounts shall be prohibited.

2310.5.2 Spills. Spills of Class I, II or IIIA liquids at or on the water shall be reported immediately to the fire department and jurisdictional authorities.

2310.5.3 Rubbish containers. Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with any one of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

2310.5.4 Marine vessels and craft. Vessels or craft shall not be made fast to fuel docks serving other vessels or craft occupying a berth at a marine motor fuel-dispensing facility.

2310.5.5 Sources of ignition. Construction, maintenance, repair and reconditioning work involving the use of open flames, arcs or spark-producing devices shall not be performed at marine motor fuel-dispensing facilities or within 50 feet (15 240 mm) of the dispensing facilities, including piers, wharves or floats, except for emergency repair work approved in writing by the fire code official. Fueling shall not be conducted at the pier, wharf or float during the course of such emergency repairs.

2310.5.5.1 Smoking. Smoking or open flames shall be prohibited within 50 feet (15 240 mm) of fueling operations. "No Smoking" signs complying with Section 310 shall be posted conspicuously about the premises. Such signs shall have letters not less than 4 inches (102 mm) in height on a background of contrasting color.

2310.5.6 Preparation of tanks for fueling. Boat owners and operators shall not offer their craft for fueling unless the tanks being filled are properly vented to dissipate fumes to the outside atmosphere.

2310.5.7 Warning signs. Warning signs shall be prominently displayed at the face of each wharf, pier or float at such elevation as to be clearly visible from the decks of marine craft being fueled. Such signs shall have letters not less than 3 inches (76 mm) in height on a background of contrasting color bearing the following or approved equivalent wording:

WARNING
NO SMOKING—STOP ENGINE WHILE FUELING,
SHUT OFF ELECTRICITY

DO NOT START ENGINE UNTIL AFTER BELOW
DECK SPACES ARE VENTILATED.

2310.6 Fire protection. Fire protection features for marine motor fuel-dispensing facilities shall comply with Sections 2310.6.1 through 2310.6.4.

2310.6.1 Standpipe hose stations. Fire hose, where provided, shall be enclosed within a cabinet, and hose stations shall be labeled: "FIRE HOSE—EMERGENCY USE ONLY."

2310.6.2 Obstruction of fire protection equipment. Materials shall not be placed on a pier in such a manner as to obstruct access to firefighting equipment or piping system control valves.

2310.6.3 Access. Where the pier is designed for vehicular traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access by fire apparatus.

2310.6.4 Portable fire extinguishers. Portable fire extinguishers in accordance with Section 906, each having a minimum rating of 20-B:C, shall be provided as follows:

1. One on each float.
2. One on the pier or wharf within 25 feet (7620 mm) of the head of the gangway to the float, unless the office is within 25 feet (7620 mm) of the gangway or is on the float and an extinguisher is provided thereon.

SECTION 2311—REPAIR GARAGES

2311.1 General. Repair garages shall comply with this section and the *California Building Code*. Repair garages for vehicles that use more than one type of fuel shall comply with the applicable provisions of this section for each type of fuel used.

Where a repair garage includes a motor fuel-dispensing facility, the fuel-dispensing operation shall comply with the requirements of this chapter for motor fuel-dispensing facilities.

2311.2 Storage and use of flammable and combustible liquids. The storage and use of flammable and combustible liquids in repair garages shall comply with Chapter 57 and Sections 2311.2.1 through 2311.2.4.

2311.2.1 Cleaning of parts. Cleaning of parts shall be conducted in listed and approved parts-cleaning machines in accordance with Chapter 57.

2311.2.2 Waste oil, motor oil and other Class IIIB liquids. Waste oil, motor oil and other Class IIIB liquids shall be stored in approved tanks or containers, which are allowed to be stored and dispensed from inside repair garages.

2311.2.2.1 Tank location. Tanks storing Class IIIB liquids in repair garages are allowed to be located at, below or above grade, provided that adequate drainage or containment is provided.

2311.2.2.2 Liquid classification. Crankcase drainings shall be classified as Class IIIB liquids unless otherwise determined by testing.

2311.2.3 Drainage and disposal of liquids and oil-soaked waste. Garage floor drains, where provided, shall drain to approved oil separators or traps discharging to a sewer in accordance with the *California Plumbing Code*. Contents of oil separators, traps and floor drainage systems shall be collected at sufficiently frequent intervals and removed from the premises to prevent oil from being carried into the sewers.

2311.2.3.1 Disposal of liquids. Crankcase drainings and liquids shall not be dumped into sewers, streams or on the ground, but shall be stored in approved tanks or containers in accordance with Chapter 57 until removed from the premises.

2311.2.3.2 Disposal of oily waste. Self-closing metal cans shall be used for oily waste.

2311.2.4 Spray finishing. Spray finishing with flammable or combustible liquids shall comply with Chapter 24.

2311.3 Sources of ignition. Sources of ignition shall not be located within 18 inches (457 mm) of the floor and shall comply with Chapters 3 and 35.

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2311.3.1 Equipment. Appliances and equipment installed in a repair garage shall comply with the provisions of the *California Building Code*, the *California Mechanical Code* and *the California Electrical Code*.

2311.3.2 Smoking. Smoking shall not be allowed in repair garages except in approved locations.

2311.4 Below-grade areas. Pits and below-grade work areas in repair garages shall comply with Sections 2311.4.1 through 2311.4.3.

2311.4.1 Construction. Pits and below-grade work areas shall be constructed in accordance with the *California Building Code*.

2311.4.2 Means of egress. Pits and below-grade work areas shall be provided with means of egress in accordance with Chapter 10.

2311.4.3 Ventilation. Where Class I liquids or LP-gas are stored or used within a building having a basement or pit wherein flammable vapors could accumulate, the basement or pit shall be provided with mechanical ventilation in accordance with the *California Mechanical Code*, at a minimum rate of $1^1/_2$ cubic feet per minute per square foot (cfm/ft^2) [0.008 m^3/(s × m^2)] to prevent the accumulation of flammable vapors.

2311.5 Vehicles powered by liquefied petroleum gas (LP-gas). Vehicles powered by LP-gas and the servicing of vehicles powered by LP-gas shall be in compliance with this chapter, Chapter 61 and NFPA 58.

2311.6 Vehicles powered by liquefied natural gas (LNG) and compressed natural gas (CNG). LNG vehicles and CNG vehicles shall comply with Sections 2311.6.1 and 2311.6.2, as applicable.

2311.6.1 Liquefied natural gas (LNG). LNG vehicle fuel system pressure shall be measured and recorded prior to entering the repair facility. The maximum allowable system pressure shall be not more than 170 psig (1172 kPa). Pressure greater than 170 psig (1172 kPa) shall be reduced by operating the vehicle or limited venting outdoors, as required.

2311.6.2 Compressed natural gas (CNG). CNG vehicle fuel system pressure and the ambient temperature shall be measured and recorded prior to entering the repair facility. Pressure greater than the indicated maximum pressure in accordance with Table 2311.6.2 shall be reduced by defueling the vehicle.

TABLE 2311.6.2—TEMPERATURE COMPENSATED CYLINDER PRESSURE TABLE[a]

GAS TEMPERATURE °F	PRESSURE IN FULL 3,600 PSI CNG CONTAINER, PSIG
123.6	4,500
120	4,455
110	4,272
100	4,105
90	3,936
80	3,768
70	3,600
60	3,432
50	3,263
40	3,094
30	2,926
20	2,757
10	2,589
0	2,421
-10	2,253
-20	2,086
-30	1,919
-40	1,753

For SI: °C = (°F – 32)/1.8, 1 psig = 6.895 kPa.

a. 3,600 psi service pressure calculated from the standard gas composition used to create the gasoline gallon equivalent (GGE).

2311.7 Fire extinguishers. Fire extinguishers shall be provided in accordance with Section 906.

2311.8 Repair garages for vehicles fueled by lighter-than-air fuels. The room, motor vehicle repair booth or motor vehicle repair space containing repair garage activities for the conversion or repair of vehicles that use CNG, LNG, hydrogen or other lighter-than-air motor fuels shall be in accordance with Sections 2311.8 through 2311.8.11 in addition to the other requirements of Section 2311. Repair garages for the repair of vehicles that use hydrogen fuel shall be in accordance with this code and NFPA 2.

Exceptions:

1. Repair garages where work is conducted only on vehicles where the motor vehicle fuel tank and system have been defueled and the motor vehicle fuel tank has been purged with nitrogen gas, and where standard operating procedures to document and maintain the fueling status throughout repair operations are approved.

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2. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance not requiring open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle. Movement of a subassembly on which the motor vehicle fuel tank remains mounted to allow access to other parts of the vehicle that are not a portion of the fuel system shall be permitted.
3. Repair garages for hydrogen-fueled vehicles where work is not performed on the motor vehicle fuel tank and is limited to the exchange of parts and maintenance not requiring open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain less than 400 cubic feet (11.3 m^3) of hydrogen.
4. Repair garages for natural-gas-fueled vehicles where work is not being performed on the motor vehicle fuel tank, and is limited to the exchange of parts and maintenance not requiring open flame or welding on the natural-gas-fueled vehicle. During the work, the natural gas in the motor vehicle fuel tank shall contain a pressure of not more than 250 psi at 70°F (1724 kPa at 21°C).

2311.8.1 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system.

Vehicles powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

2311.8.2 Repair garages used for the repair of hydrogen-fueled vehicles. Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with the *California Mechanical Code* and Chapter 6 of NFPA 2.

2311.8.3 Motor vehicle repair rooms. Motor vehicle repair rooms shall be enclosed with not less than 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code*, or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with 1-hour-rated opening protectives.

2311.8.4 Motor vehicle repair booths. The design and construction of motor vehicle repair booths shall be in accordance with Sections 2311.8.4.1 through 2311.8.4.4.

2311.8.4.1 Construction. Motor vehicle repair booths shall be constructed of approved noncombustible materials. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of motor vehicle repair booths shall be sealed in an approved manner.

2311.8.4.2 Surfaces. The interior surfaces of motor vehicle repair booths shall be constructed to permit the free passage of exhaust air from all parts of the interior.

2311.8.4.3 Means of egress. Means of egress shall be provided in accordance with Chapter 10.

Exception: Means of egress doors from premanufactured motor vehicle repair booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

2311.8.4.4 Clear space. Motor vehicle repair booths shall be installed so that all parts of the booth be provided with ready access for cleaning. A clear area of not less than 3 feet (914 mm) wide shall be maintained on all sides of the motor vehicle repair booth. This clear area shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a fire-resistance rating of not less than 1 hour, provided that the motor vehicle repair booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a motor vehicle repair booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the motor vehicle repair booth can be adequately maintained and cleaned.

2311.8.5 Motor vehicle repair spaces. Where such spaces are not separately enclosed, noncombustible spray curtains shall be provided to restrict the spread of flammable gases.

2311.8.6 Fire protection. Motor vehicle repair booths or spaces installed in a room or area protected by an automatic sprinkler system shall have the protection extended to include the inside of the motor vehicle repair booth or space.

2311.8.7 Fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided for motor vehicle repair rooms, motor vehicle repair booths or motor vehicle repair spaces.

2311.8.8 Exhaust ventilation system. Repair garages used for the repair of CNG, LNG, or other lighter-than-air motor fuels other than hydrogen shall be provided with an approved mechanical ventilation system. The mechanical exhaust ventilation system shall be in accordance with the *California Mechanical Code* and Sections 2311.8.8.1 and 2311.8.8.2.

Exception: Where approved by the fire code official, natural ventilation shall be permitted in lieu of mechanical exhaust ventilation.

2311.8.8.1 Design. For indoor locations, air supply inlets and exhaust outlets for mechanical ventilation shall be arranged to provide uniformly distributed air movement with inlets uniformly arranged on walls near floor level and outlets at the high point of the room in walls or the roof.

Failure of the ventilation system shall cause the fueling system to shut down.

The exhaust ventilation rate shall be not less than 1 cubic foot per minute (0.03 m^3/minute) per 12 cubic feet (34 m^3) of room volume.

2311.8.8.2 Operation. The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with Sections 2311.8.9 through 2311.8.9.2.
2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

2311.8.9 Gas detection system. Repair garages used for repair of vehicles fueled by nonodorized gases, including, but not limited to, hydrogen and nonodorized LNG, shall be provided with a gas detection system that complies with Section 916. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

2311.8.9.1 System activation. Activation of the gas detection alarm shall result in all of the following:

1. Initiation of local audible and visual alarms in approved locations.
2. Deactivation of heating systems located in the repair garage.
3. Activation of the mechanical exhaust ventilation system, where the ventilation system is interlocked with gas detection.

2311.8.9.2 Failure of the gas detection system. Failure of the gas detection system shall automatically deactivate the heating system, activate the mechanical exhaust ventilation system where the system is interlocked with the gas detection system and cause a trouble signal to sound in an approved location.

2311.8.10 Classified electrical area. Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2, classified locations, as set forth in *the California Electrical Code*.

Exceptions:

1. Rooms with exhaust ventilation of not less than 1 cubic foot per minute per square foot (0.3 m^3/ min/m^2) of floor area, with suction taken from a point within 18 inches (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.
2. Rooms used for the repair of hydrogen-fueled vehicles that have an approved exhaust ventilation system in accordance with the *California Mechanical Code* and NFPA 2.

2311.8.11 Defueling equipment required at vehicle maintenance and repair facilities. Facilities for repairing or replacing hydrogen fuel tanks on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage tanks. Where work must be performed on a motor vehicle's fuel tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with Section 2309.6 and NFPA 2.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 24 – FLAMMABLE FINISHES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
2407.2			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

24 FLAMMABLE FINISHES

User notes:

About this chapter: Chapter 24 provides requirements that govern operations where flammable or combustible finishes are applied by spraying, dipping, powder coating or flow-coating processes. As with all operations involving flammable or combustible liquids and combustible dusts or vapors, controlling ignition sources and methods of reducing or controlling flammable vapors or combustible dusts at or near these operations are emphasized.

SECTION 2401—GENERAL

2401.1 Scope. This chapter shall apply to locations or areas where any of the following activities are conducted:

1. The application of flammable finishes to articles or materials by means of spray apparatus.
2. The application of flammable finishes by dipping or immersing articles or materials into the contents of tanks, vats or containers of flammable or combustible liquids for coating, finishing, treatment or similar processes.
3. The application of flammable finishes by applying combustible powders to articles or materials utilizing powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.
4. Floor surfacing or finishing operations using Class I or II liquids in areas exceeding 350 square feet (32.5 m^2).
5. The application of flammable finishes consisting of dual-component coatings or Class I or II liquids where applied by brush or roller in quantities exceeding 1 gallon (4 L).

2401.2 Nonapplicability. This chapter shall not apply to spray finishing utilizing flammable or combustible liquids that do not sustain combustion, including:

1. Liquids that do not have a fire point when tested in accordance with ASTM D92.
2. Liquids with a flashpoint greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight.

2401.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

SECTION 2402—DEFINITIONS

2402.1 Definitions. The following terms are defined in Chapter 2:

DETEARING.

DIP TANK.

ELECTROSTATIC FLUIDIZED BED.

FLAMMABLE FINISHES.

FLAMMABLE VAPOR AREA.

FLUIDIZED BED.

LIMITED SPRAYING SPACE.

RESIN APPLICATION AREA.

ROLL COATING.

SPRAY BOOTH.

SPRAY ROOM.

SPRAYING SPACE.

SECTION 2403—PROTECTION OF OPERATIONS

2403.1 General. Operations covered by this chapter shall be protected as required by Sections 2403.2 through 2403.4.4.

2403.2 Sources of ignition. Protection against sources of ignition shall be provided in accordance with Sections 2403.2.1 through 2403.2.8.

2403.2.1 Electrical wiring and equipment. Electrical wiring and equipment shall comply with this chapter and *the California Electrical Code.*

2403.2.1.1 Flammable vapor areas. Electrical wiring and equipment in flammable vapor areas shall be of an explosionproof type approved for use in such hazardous locations. Such areas shall be considered to be Class I, Division 1, or Class II, Division 1, hazardous locations in accordance with *the California Electrical Code.*

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2403.2.1.2 Areas subject to deposits of residues. Electrical equipment, flammable vapor areas or drying operations that are subject to splashing or dripping of liquids shall be specifically approved for locations containing deposits of readily ignitable residue and explosive vapors.

Exceptions:

1. This provision shall not apply to wiring in rigid conduit, threaded boxes or fittings not containing taps, splices or terminal connections.
2. This provision shall not apply to electrostatic equipment allowed by Section 2407.

In resin application areas, electrical wiring and equipment that is subject to deposits of combustible residues shall be *listed* for such exposure and shall be installed as required for hazardous (classified) locations. Electrical wiring and equipment not subject to deposits of combustible residues shall be installed as required for ordinary hazard locations.

2403.2.1.3 Areas adjacent to spray booths. Electrical wiring and equipment located outside of, but within 3 feet (914 mm) of openings in a spray booth or a spray room, shall be approved for Class I, Division 2, or Class II, Division 2, hazardous locations, whichever is applicable.

2403.2.1.4 Areas subject to overspray deposits. Electrical equipment in flammable vapor areas located such that deposits of combustible residues could readily accumulate thereon shall be specifically approved for locations containing deposits of readily ignitable residue and explosive vapors in accordance with *the California Electrical Code*.

Exceptions:

1. Wiring in rigid conduit.
2. Boxes or fittings not containing taps, splices or terminal connections.
3. Equipment allowed by Sections 2404 and 2407 and Chapter 30.

2403.2.2 Open flames and sparks. Open flames and spark-producing devices shall not be located in flammable vapor areas and shall not be located within 20 feet (6096 mm) of such areas unless separated by a permanent partition.

Exception: Drying and baking apparatus complying with Section 2404.8.1.2.

2403.2.3 Hot surfaces. Heated surfaces having a temperature sufficient to ignite vapors shall not be located in flammable vapor areas. Space-heating appliances, steam pipes or hot surfaces in a flammable vapor area shall be located such that they are not subject to accumulation of deposits of combustible residues.

Exception: Drying apparatus complying with Section 2404.8.1.2.

2403.2.4 Equipment enclosures. Equipment or apparatus that is capable of producing sparks or particles of hot metal that would fall into a flammable vapor area shall be totally enclosed.

2403.2.5 Grounding. Metal parts of spray booths, exhaust ducts and piping systems conveying Class I or II liquids shall be electrically grounded in accordance with *the California Electrical Code*. Metallic parts located in resin application areas, including but not limited to exhaust ducts, ventilation fans, spray application equipment, workpieces and piping, shall be electrically grounded.

2403.2.6 Smoking prohibited. Smoking shall be prohibited in flammable vapor areas and hazardous materials storage rooms associated with flammable finish processes. “No Smoking” signs complying with Section 310 shall be conspicuously posted in such areas.

2403.2.7 Welding warning signs. Welding, cutting and similar spark-producing operations shall not be conducted in or adjacent to flammable vapor areas or dipping or coating operations unless precautions have been taken to provide safety. Conspicuous signs with the following warning shall be posted in the vicinity of flammable vapor areas, dipping operations and paint storage rooms:

NO WELDING
THE USE OF WELDING OR CUTTING
EQUIPMENT IN OR NEAR THIS AREA
IS DANGEROUS BECAUSE OF FIRE
AND EXPLOSION HAZARDS. WELDING
AND CUTTING SHALL BE DONE ONLY
UNDER THE SUPERVISION OF THE
PERSON IN CHARGE.

2403.2.8 Powered industrial trucks. Powered industrial trucks used in electrically classified areas shall be listed for such use.

2403.3 Storage, use and handling of flammable and combustible liquids. The storage, use and handling of flammable and combustible liquids shall be in accordance with this section and Chapter 57.

2403.3.1 Use. Containers supplying spray nozzles shall be of a closed type or provided with metal covers that are kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons (37.9 L) in capacity.

2403.3.2 Valves. Containers and piping to which a hose or flexible connection is attached shall be provided with a shutoff valve at the connection. Such valves shall be kept shut when hoses are not in use.

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2403.3.3 Pumped liquid supplies. Where flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, pump discharge lines shall be provided with an approved relief valve discharging to pump suction or a safe detached location.

2403.3.4 Liquid transfer. Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers. Not less than one container shall be grounded. Piping systems for Class I and II liquids shall be permanently grounded.

2403.3.5 Class I liquids as solvents. Class I liquids used as solvents shall be used in spray gun and equipment cleaning machines that have been listed and approved for such purpose or shall be used in spray booths or spray rooms in accordance with Sections 2403.3.5.1 and 2403.3.5.2.

2403.3.5.1 Listed devices. Cleaning machines for spray guns and equipment shall not be located in areas open to the public and shall be separated from ignition sources in accordance with their listings or by a distance of 3 feet (914 mm), whichever is greater. The quantity of solvent used in a machine shall not exceed the design capacity of the machine.

2403.3.5.2 Within spray booths and spray rooms. Where solvents are used for cleaning spray nozzles and auxiliary equipment within spray booths and spray rooms, the ventilating equipment shall be operated during cleaning.

2403.3.6 Class II and III liquids. Solvents used outside of spray booths, spray rooms or listed and approved spray gun and equipment cleaning machines shall be restricted to Class II and III liquids.

2403.4 Operations and maintenance. Flammable vapor areas, exhaust fan blades and exhaust ducts shall be kept free from the accumulation of deposits of combustible residues. Where excessive residue accumulates in such areas, spraying operations shall be discontinued until conditions are corrected.

2403.4.1 Tools. Scrapers, spuds and other tools used for cleaning purposes shall be constructed of nonsparking materials.

2403.4.2 Residue. Residues removed during cleaning and debris contaminated with residue shall be immediately removed from the premises and properly disposed.

2403.4.3 Waste cans. Approved metal waste cans equipped with self-closing lids shall be provided wherever rags or waste are impregnated with finishing material. Such rags and waste shall be deposited therein immediately after being utilized. The contents of waste cans shall be properly disposed of not less than once daily and at the end of each shift.

2403.4.4 Solvent recycling. Solvent distillation equipment used to recycle and clean dirty solvents shall comply with Section 5705.4.

SECTION 2404—SPRAY FINISHING

2404.1 General. The application of flammable or combustible liquids by means of spray apparatus in continuous or intermittent processes shall be in accordance with the requirements of Sections 2403 and 2404.4 through 2404.11.4.

2404.2 Prohibited enclosures for spray application operations. Inflatable or portable enclosures shall not be used for spray application of flammable finishes.

Exception: Enclosures for the spray application of flammable finishes in marinas, dry docking areas or construction areas shall comply with Section 2404.3.

2404.3 Membrane enclosures. The design, construction, protection, operation and maintenance of membrane enclosures shall be in accordance with NFPA 33.

2404.4 Location of spray-finishing operations. Spray-finishing operations conducted in buildings used for Group A, E, I or R occupancies shall be located in a spray room protected with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 and separated vertically and horizontally from the remainder of the building by fire barrier walls and horizontal assemblies with not less than a 1-hour fire-resistance rating in accordance with the *California Building Code*. In other occupancies, spray-finishing operations shall be conducted in a spray room, spray booth or limited spraying space approved for such use.

Exceptions:

1. Automobile undercoating spray operations and spray-on automotive lining operations conducted in areas with approved natural or mechanical ventilation shall be exempt from the provisions of Section 2404 when approved and where utilizing Class IIIA or IIIB combustible liquids.
2. In buildings other than Group A, E, I or R occupancies, approved limited spraying space in accordance with Section 2404.11.
3. Resin application areas used for manufacturing of reinforced plastics complying with Section 2409 shall not be required to be located in a spray room, spray booth or spraying space.

2404.5 Design and construction. Design and construction of spray rooms, spray booths and spray spaces shall be in accordance with Sections 2404.5.1 through 2404.5.5.1.

2404.5.1 Spray rooms. Spray rooms shall be constructed and designed in accordance with Section 416 of the *California Building Code* and Section 2404.5.2 of this code, and shall comply with Sections 2404.6 through 2404.10 of this code.

2404.5.2 Floor. Combustible floor construction in spray rooms shall be covered by approved, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray rooms.

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2404.5.3 Spray booths. The design and construction of spray booths shall be in accordance with Sections 2404.5.3.1 through 2404.5.3.6, Sections 2404.6 through 2404.10 and NFPA 33.

2404.5.3.1 Construction. Spray booths shall be constructed of approved noncombustible materials. Aluminum shall not be used. Where walls or ceiling assemblies are constructed of sheet metal, single-skin assemblies shall be not thinner than 0.0478 inch (18 gage) (1.2 mm) and each sheet of double-skin assemblies shall be not thinner than 0.0359 inch (20 gage) (0.9 mm). Structural sections of spray booths are allowed to be sealed with latex-based or similar caulks and sealants.

2404.5.3.2 Surfaces. The interior surfaces of spray booths shall be smooth; shall be constructed so as to permit the free passage of exhaust air from all parts of the interior, and to facilitate washing and cleaning; and shall be designed to confine residues within the booth. Aluminum shall not be used.

2404.5.3.3 Floor. Combustible floor construction in spray booths shall be covered by approved, noncombustible, nonsparking material, except where combustible coverings, including but not limited to thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spray booths.

2404.5.3.4 Means of egress. Means of egress shall be provided in accordance with Chapter 10.

Exception: Means of egress doors from premanufactured spray booths shall be not less than 30 inches (762 mm) in width by 80 inches (2032 mm) in height.

2404.5.3.5 Clear space. Spray booths shall be installed so that all parts of the booth are able to be accessed for cleaning. A clear space of not less than 3 feet (914 mm) shall be maintained on all sides of the spray booth. This clear space shall be kept free of any storage or combustible construction.

Exceptions:

1. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to or directly against an interior partition, wall or floor/ceiling assembly that has a fire-resistance rating of not less than 1 hour, provided that the spray booth can be adequately maintained and cleaned.
2. This requirement shall not prohibit locating a spray booth closer than 3 feet (914 mm) to an exterior wall or a roof assembly, provided that the wall or roof is constructed of noncombustible material and the spray booth can be adequately maintained and cleaned.

2404.5.3.6 Size. The aggregate area of spray booths in a building shall not exceed the lesser of 10 percent of the area of any floor of a building or the basic area allowed for a Group H-2 occupancy without area increases, as set forth in the *California Building Code*.

Exception: One individual booth not exceeding 500 square feet (46 m^2).

2404.5.4 Limited finishing workstation. A limited finishing workstation shall comply with the applicable provisions of NFPA 33 and Sections 2404.6 through 2404.10.

2404.5.5 Spraying spaces. Spraying spaces shall be designed and constructed in accordance with the *California Building Code*, and Section 2404.5.5.1 and Sections 2404.6 through 2404.10 of this code.

2404.5.5.1 Floor. Combustible floor construction in spraying spaces shall be covered by approved, noncombustible, nonsparking material, except where combustible coverings, such as thin paper or plastic and strippable coatings, are utilized over noncombustible materials to facilitate cleaning operations in spraying spaces.

2404.6 Fire protection. Spray booths and spray rooms shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9. Protection shall extend to exhaust plenums, exhaust ducts and both sides of dry filters where such filters are used.

2404.6.1 Fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided for spraying areas in accordance with the requirements for an extra (high) hazard occupancy.

2404.7 Housekeeping, maintenance and storage of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4, 2404.7.1 and 2404.7.2.

2404.7.1 Different coatings. Spray booths, spray rooms and spraying spaces shall not be alternately utilized for different types of coating materials where the combination of materials is conducive to spontaneous ignition, unless all deposits of one material are removed from the booth, room or space and exhaust ducts prior to spraying with a different material.

2404.7.2 Protection of sprinklers. Automatic sprinklers installed in flammable vapor areas shall be protected from the accumulation of residue from spraying operations in an approved manner. Bags used as a protective covering shall be 0.003-inch-thick (0.076 mm) polyethylene or cellophane or shall be thin paper. Automatic sprinklers contaminated by overspray particles shall be replaced with new automatic sprinklers.

2404.8 Sources of ignition. Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2404.8.1 through 2404.8.2.4.

2404.8.1 Drying operations. Spray booths and spray rooms shall not be alternately used for the purpose of drying by arrangements or methods that could cause an increase in the surface temperature of the spray booth or spray room except in accordance with Sections 2404.8.1.1 and 2404.8.1.2. Except as specifically provided in this section, drying or baking units utilizing a heating system having open flames or that are capable of producing sparks shall not be installed in a flammable vapor areas.

2404.8.1.1 Spraying procedure. The spraying procedure shall use low-volume spray application.

2404.8.1.2 Drying apparatus. Fixed drying apparatus shall comply with this chapter and the applicable provisions of Chapter 30. Where recirculation ventilation is provided in accordance with Section 2404.9.2, the heating system shall not be within the recirculation air path.

2404.8.1.2.1 Interlocks. The spraying apparatus, drying apparatus and ventilating system for the spray booth or spray room shall be equipped with interlocks arranged to accomplish all of the following:

1. Prevent operation of the spraying apparatus while drying operations are in progress.
2. Where the drying apparatus is located in the spray booth or spray room, prevent operation of the drying apparatus until a timed purge of spray vapors from the spray booth or spray room is complete. This purge time shall be based on completing not fewer than four air changes of spray booth or spray room volume or for a period of not less than 3 minutes, whichever is greater.
3. Have the ventilating system maintain a safe atmosphere within the spray booth or spray room during the drying process and automatically shut off drying apparatus in the event of a failure of the ventilating system.
4. Shut off the drying apparatus automatically if the discharge temperature of the air heater exceeds the maximum discharge air temperature allowed in accordance with the heater's listing or 221°F (105°C).

2404.8.1.2.2 Portable infrared apparatus. Where a portable infrared drying apparatus is used, electrical wiring and portable infrared drying equipment shall comply with *the California Electrical Code*. Electrical equipment located within 18 inches (457 mm) of floor level shall be approved for Class I, Division 2, hazardous locations. Metallic parts of drying apparatus shall be electrically bonded and grounded. During spraying operations, portable drying apparatus and electrical connections and wiring thereto shall not be located within spray booths, spray rooms or other areas where spray residue would be deposited thereon.

2404.8.2 Illumination. Where spraying spaces, spray rooms or spray booths are illuminated through glass panels or other transparent materials, only fixed luminaires shall be utilized as a source of illumination.

2404.8.2.1 Glass panels. Panels for luminaires or for observation shall be of heat-treated glass, wired glass or hammered wire glass and shall be sealed to confine vapors, mists, residues, dusts and deposits to the flammable vapor area. Panels for luminaires shall be separated from the luminaire to prevent the surface temperature of the panel from exceeding 221°F (105°C).

2404.8.2.2 Exterior luminaires. Luminaires attached to the walls or ceilings of a flammable vapor area, but outside of any classified area and separated from the flammable vapor areas by vapor-tight glass panels, shall be suitable for use in ordinary hazard locations. Such luminaires shall be serviced from outside the flammable vapor areas.

2404.8.2.3 Integral luminaires. Luminaires that are an integral part of the walls or ceiling of a flammable vapor area are allowed to be separated from the flammable vapor area by glass panels that are an integral part of the luminaire. Such luminaires shall be *listed* for use in Class I, Division 2, or Class II, Division 2, locations, whichever is applicable, and shall be suitable for accumulations of deposits of combustible residues. Such luminaires are allowed to be serviced from inside the flammable vapor area.

2404.8.2.4 Portable electric lamps. Portable electric lamps shall not be used in flammable vapor areas during spraying operations. Portable electric lamps used during cleaning or repairing operations shall be of a type approved for hazardous locations.

2404.9 Ventilation. Mechanical ventilation of flammable vapor areas shall be provided in accordance with Section 502.7 of the *California Mechanical Code*.

2404.9.1 Operation. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and finishing material residue to be exhausted. Spraying equipment shall be interlocked with the ventilation of the flammable vapor areas such that spraying operations cannot be conducted unless the ventilation system is in operation.

2404.9.2 Recirculation. Air exhausted from spraying operations shall not be recirculated.

Exceptions:

1. Air exhausted from spraying operations is allowed to be recirculated as makeup air for unmanned spray operations, provided that all of the following conditions exist:
   - 1.1. The solid particulate has been removed.
   - 1.2. The vapor concentration is less than 25 percent of the LFL.
   - 1.3. Approved equipment is used to monitor the vapor concentration.
   - 1.4. When the vapor concentration exceeds 25 percent of the LFL, both of the following shall occur:
     - 1.4.1. An alarm shall sound.
     - 1.4.2. Spray operations shall automatically shut down.
   - 1.5. In the event of shutdown of the vapor concentration monitor, 100 percent of the air volume specified in Section 509 of the *California Mechanical Code* is automatically exhausted.
2. Air exhausted from spraying operations is allowed to be recirculated as makeup air to manned spraying operations where all of the conditions provided in Exception 1 are included in the installation and documents have been prepared to show that the installation does not pose a life safety hazard to personnel inside the spray booth, spraying space or spray room.

2404.9.3 Air velocity. The ventilation system shall be designed, installed and maintained so that the flammable contaminants are diluted in noncontaminated air to maintain concentrations in the exhaust airflow below 25 percent of the contaminant's lower flammable limit (LFL). In addition, the spray booth shall be provided with mechanical ventilation so that the average air velocity through openings is in accordance with Sections 2404.9.3.1 and 2404.9.3.2.

2404.9.3.1 Open-face or open-front spray booth. For spray application operations conducted in an open-face or open-front spray booth, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through all openings is not less than 100 feet per minute (0.51 m/s).

Exception: For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).

2404.9.3.2 Enclosed spray booth or spray room with openings for product conveyance. For spray application operations conducted in an enclosed spray booth or spray room with openings for product conveyance, the ventilation system shall be designed, installed and maintained so that the average air velocity into the spray booth through openings is not less than 100 feet per minute (0.51 m/s).

Exceptions:

1. For fixed or automated electrostatic spray application equipment, the average air velocity into the spray booth through all openings shall be not less than 50 feet per minute (0.25 m/s).
2. Where methods are used to reduce cross drafts that can draw vapors and overspray through openings from the spray booth or spray room, the average air velocity into the spray booth or spray room shall be that necessary to capture and confine vapors and overspray to the spray booth or spray room.

2404.9.4 Ventilation obstruction. Articles being sprayed shall be positioned in a manner that does not obstruct collection of overspray.

2404.9.5 Independent ducts. Each spray booth and spray room shall have an independent exhaust duct system discharging to the outside.

Exceptions:

1. Multiple spray booths having a combined frontal area of 18 square feet (1.67 m^2) or less are allowed to have a common exhaust where identical spray finishing material is used in each booth. If more than one fan serves one booth, fans shall be interconnected such that all fans will operate simultaneously.
2. Where treatment of exhaust is necessary for air pollution control or for energy conservation, ducts shall be allowed to be manifolded if all of the following conditions are met:
   2.1. The sprayed materials used are compatible and will not react or cause ignition of the residue in the ducts.
   2.2. Nitrocellulose-based finishing material shall not be used.
   2.3. A filtering system shall be provided to reduce the amount of overspray carried into the duct manifold.
   2.4. Automatic sprinkler protection shall be provided at the junction of each booth exhaust with the manifold, in addition to the protection required by this chapter.

2404.9.6 Termination point. The termination point for exhaust ducts discharging to the atmosphere shall be not less than the following distances:

1. Ducts conveying explosive or flammable vapors, fumes or dusts: 30 feet (9144 mm) from the lot line; 10 feet (3048 mm) from openings into the building; 6 feet (1829 mm) from exterior walls and roofs; 30 feet (9144 mm) from combustible walls or openings into the building that are in the direction of the exhaust discharge; 10 feet (3048 mm) above adjoining grade.
2. Other product-conveying outlets: 10 feet (3048 mm) from the lot line; 3 feet (914 mm) from exterior walls and roofs; 10 feet (3048 mm) from openings into the building; 10 feet (3048 mm) above adjoining grade.

2404.9.7 Fan motors and belts. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating elements shall be nonferrous or nonsparking or the casing shall consist of, or be lined with, such material. Belts shall not enter the duct or booth unless the belt and pulley within the duct are tightly enclosed.

2404.9.8 Filters. Air intake filters that are part of a wall or ceiling assembly shall be listed as Class I or II in accordance with UL 900. Exhaust filters shall be required.

2404.9.8.1 Supports. Supports and holders for filters shall be constructed of noncombustible materials.

2404.9.8.2 Attachment. Overspray collection filters shall be readily removable and able to be accessed for cleaning or replacement.

2404.9.8.3 Maintaining air velocity. Visible gauges, audible alarms or pressure-activated devices shall be installed to indicate or ensure that the required air velocity is maintained.

2404.9.8.4 Filter rolls. Spray booths equipped with a filter roll that is automatically advanced when the air velocity is reduced to less than 100 feet per minute (0.51 m/s) shall be arranged to shut down the spraying operation if the filter roll fails to advance automatically.

2404.9.8.5 Filter disposal. Discarded filter pads shall be immediately removed to a safe, detached location or placed in a noncombustible container with a tight-fitting lid and disposed of properly.

2404.9.8.6 Spontaneous ignition. Spray booths using dry filters shall not be used for spraying materials that are highly susceptible to spontaneous heating and ignition. Filters shall be changed prior to spraying materials that could react with other materials previously collected. An example of a potentially reactive combination includes lacquer when combined with varnishes, stains or primers.

2404.9.8.7 Waterwash spray booths. Waterwash spray booths shall be of an approved design so as to prevent excessive accumulation of deposits in ducts and residue at duct outlets. Such booths shall be arranged so that air and overspray are drawn through a continuously flowing water curtain before entering an exhaust duct to the building exterior.

2404.10 Interlocks. Interlocks for spray application finishes shall be in accordance with Sections 2404.10.1 through 2404.10.2.

2404.10.1 Automated spray application operations. Where protecting automated spray application operations, automatic fire-extinguishing systems shall be equipped with an approved interlock feature that will, upon discharge of the system, automatically stop the spraying operations and workpiece conveyors into and out of the flammable vapor areas. Where the building is equipped with a fire alarm system, discharge of the automatic fire-extinguishing system shall also activate the building alarm notification appliances.

2404.10.1.1 Alarm station. A manual fire alarm and emergency system shutdown station shall be installed to serve each flammable vapor area. When activated, the station shall accomplish the functions indicated in Section 2404.10.1.

2404.10.1.2 Alarm station location. Not less than one manual fire alarm and emergency system shutdown station shall be provided with ready access for operating personnel. Where access to this station is likely to involve exposure to danger, an additional station shall be located adjacent to an exit from the area.

2404.10.2 Ventilation interlock prohibited. Air makeup and flammable vapor area exhaust systems shall not be interlocked with the fire alarm system and shall remain in operation during a fire alarm condition.

Exception: Where the type of fire-extinguishing system used requires such ventilation to be discontinued, air makeup and exhaust systems shall shut down and dampers shall close.

2404.11 Limited spraying spaces. Limited spraying spaces shall comply with Sections 2404.11.1 through 2404.11.4.

2404.11.1 Job size. The aggregate surface area to be sprayed shall not exceed 9 square feet (0.84 m^2).

2404.11.2 Frequency. Spraying operations shall not be of a continuous nature.

2404.11.3 Ventilation. Positive mechanical ventilation providing not fewer than six complete air changes per hour shall be installed. Such system shall meet the requirements of this code for handling flammable vapor areas. Explosion venting is not required.

2404.11.4 Electrical wiring. Electrical wiring within 10 feet (3048 mm) of the floor and 20 feet (6096 mm) horizontally of the limited spraying space shall be designed for Class I, Division 2 locations in accordance with *the California Electrical Code*.

SECTION 2405—DIPPING OPERATIONS

2405.1 General. Dip-tank operations shall comply with the requirements of Section 2403 and Sections 2405.2 through 2405.11.

2405.2 Location of dip-tank operations. Dip-tank operations conducted in buildings used for Group A, I or R occupancies shall be located in a room designed for that purpose, equipped with an approved automatic sprinkler system and separated vertically and horizontally from other areas in accordance with the *California Building Code*.

2405.3 Construction of dip tanks. Dip tanks shall be constructed in accordance with Sections 2405.3.1 through 2405.3.4.3 and NFPA 34. Dip tanks, including drain boards, shall be constructed of noncombustible material and their supports shall be of heavy metal, reinforced concrete or masonry.

2405.3.1 Overflow. Dip tanks greater than 150 gallons (568 L) in capacity or 10 square feet (0.93 m^2) in liquid surface area shall be equipped with a trapped overflow pipe leading to an approved location outside the building. The bottom of the overflow connection shall be not less than 6 inches (152 mm) below the top of the tank.

2405.3.2 Bottom drains. Dip tanks greater than 500 gallons (1893 L) in liquid capacity shall be equipped with bottom drains that are arranged to automatically and manually drain the tank quickly in the event of a fire unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Access to the manual operation shall be from a safe location. Where gravity flow is not practicable, automatic pumps shall be provided. Such drains shall be trapped and discharged to a closed, vented salvage tank or to an approved outside location.

Exception: Dip tanks containing Class IIIB combustible liquids where the liquids are not heated above room temperature and the process area is protected by automatic sprinklers.

2405.3.3 Dipping liquid temperature control. Protection against the accumulation of vapors, self-ignition and excessively high temperatures shall be provided for dipping liquids that are heated directly or heated by the surfaces of the object being dipped.

2405.3.4 Dip-tank covers. Dip-tank covers allowed by Section 2405.4.1 shall be capable of manual operation and shall be automatic closing by approved automatic-closing devices designed to operate in the event of a fire.

2405.3.4.1 Construction. Covers shall be constructed of noncombustible material or be of a tin-clad type with enclosing metal applied with locked joints.

2405.3.4.2 Supports. Chain or wire rope shall be utilized for cover supports or operating mechanisms.

2405.3.4.3 Closed covers. Covers shall be kept closed when tanks are not in use.

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2405.4 Fire protection. Dip-tank operations shall be protected in accordance with Sections 2405.4.1 through 2405.4.2.

2405.4.1 Fixed fire-extinguishing equipment. An approved automatic fire-extinguishing system or dip-tank cover in accordance with Section 2405.3.4 shall be provided for the following dip tanks:

1. Dip tanks less than 150 gallons (568 L) in capacity or 10 square feet (0.93 m^2) in liquid surface area.
2. Dip tanks containing a liquid with a flash point below 110°F (43°C) used in such manner that the liquid temperature could equal or be greater than its flash point from artificial or natural causes, and having both a capacity of more than 10 gallons (37.9 L) and a liquid surface area of more than 4 square feet (0.37 m^2).

2405.4.1.1 Fire-extinguishing system. An approved automatic fire-extinguishing system shall be provided for dip tanks with a 150-gallon (568 L) or more capacity or 10 square feet (0.93 m^2) or larger in a liquid surface area. Fire-extinguishing system design shall be in accordance with NFPA 34.

2405.4.2 Portable fire extinguishers. Areas in the vicinity of dip tanks shall be provided with portable fire extinguishers complying with Section 906 and suitable for flammable and combustible liquid fires as specified for extra (high) hazard occupancies.

2405.5 Housekeeping, maintenance and storage of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4.

2405.6 Sources of ignition. Control of sources of ignition shall be in accordance with Section 2403.2.

2405.7 Ventilation of flammable vapor areas. Flammable vapor areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors. Required ventilation systems shall be arranged such that the failure of any ventilating fan shall automatically stop the dipping conveyor system.

2405.8 Conveyor interlock. Dip tanks utilizing a conveyor system shall be arranged such that in the event of a fire, the conveyor system shall automatically cease motion and the required tank bottom drains shall open.

2405.9 Hardening and tempering tanks. Hardening and tempering tanks shall comply with Sections 2405.3 through 2405.3.3, 2405.9.4 and 2405.8, but shall be exempt from other provisions of Section 2405.

2405.9.1 Location. Tanks shall be located as far as practical from furnaces and shall not be located on or near combustible floors.

2405.9.2 Hoods. Tanks shall be provided with a noncombustible hood and vent or other approved venting means, terminating outside of the structure to serve as a vent in case of a fire. Such vent ducts shall be treated as flues and proper clearances shall be maintained from combustible materials.

2405.9.3 Alarms. Tanks shall be equipped with a high-temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches 50°F (10°C) below the flash point.

2405.9.4 Fire protection. Hardening and tempering tanks greater than 500 gallons (1893 L) in capacity or 25 square feet (2.3 m^2) in liquid surface area shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9.

2405.9.5 Use of air pressure. Air under pressure shall not be used to fill or agitate oil in tanks.

2405.10 Flow-coating operations. Flow-coating operations shall comply with the requirements for dip tanks. The area of the sump and any areas on which paint flows shall be considered to be the area of a dip tank.

2405.10.1 Paint supply. Paint shall be supplied by a gravity tank not exceeding 10 gallons (38 L) in capacity or by direct low-pressure pumps arranged to shut down automatically in case of a fire by means of approved heat-actuated devices.

2405.11 Roll-coating operations. Roll-coating operations shall comply with Section 2405.10. In roll-coating operations utilizing flammable or combustible liquids, sparks from static electricity shall be prevented by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by the installation of static collectors, or by maintaining a conductive atmosphere such as a high relative humidity.

SECTION 2406—POWDER COATING

2406.1 General. Operations using finely ground particles of protective finishing material applied in dry powder form by a fluidized bed, an electrostatic fluidized bed, powder spray guns or electrostatic powder spray guns shall comply with Sections 2406.2 through 2406.7. In addition, Section 2407 shall apply to fixed electrostatic equipment used in powder coating operations.

2406.2 Location. Powder coating operations shall be conducted in enclosed powder coating rooms, enclosed powder coating facilities that are ventilated or ventilated spray booths.

2406.3 Construction of powder coating rooms and booths. Powder coating rooms shall be constructed of noncombustible materials. Spray booths shall be constructed in accordance with Section 2404.5.3.

Exception: Listed spray-booth assemblies that are constructed of other materials shall be allowed.

2406.4 Fire protection. Areas used for powder coating shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9.

2406.4.1 Additional protection for fixed systems. Automated powder application equipment shall be protected by the installation of an approved, supervised flame detection apparatus that shall react to the presence of flame within 0.5 second and shall accomplish all of the following:

1. Shutting down of energy supplies (electrical and compressed air) to conveyor, ventilation, application, transfer and powder collection equipment.

2. Closing of segregation dampers in associated ductwork to interrupt airflow from application equipment to powder collectors.
3. Activation of an alarm that is audible throughout the powder coating room or booth.

2406.4.2 Fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided for areas used for powder coating in accordance with the requirements for an extra-hazard occupancy.

2406.5 Operation and maintenance. Powder coating areas shall be kept free from the accumulation of powder coating dusts, including horizontal surfaces such as ledges, beams, pipes, hoods, booths and floors.

2406.5.1 Cleaning. Surfaces shall be cleaned in such a manner so as to avoid scattering dusts to other places or creating dust clouds. Vacuum sweeping equipment shall be of a type approved for use in hazardous locations.

2406.6 Sources of ignition. Control of sources of ignition shall be in accordance with Section 2403.2 and Sections 2406.6.1 through 2406.6.4.

2406.6.1 Drying, curing and fusion equipment. Drying, curing and fusion equipment shall comply with Chapter 30.

2406.6.2 Spark-producing metals. Iron or spark-producing metals shall be prevented from being introduced into the powders being applied by magnetic separators, filter-type separators or by other approved means.

2406.6.3 Preheated parts. When parts are heated prior to coating, the temperature of the parts shall not exceed the ignition temperature of the powder to be used.

2406.6.4 Grounding and bonding. Precautions shall be taken to minimize the possibility of ignition by static electrical sparks through static bonding and grounding, where possible, of powder transport, application and recovery equipment.

2406.7 Ventilation. Exhaust ventilation shall be sufficient to maintain the atmosphere below one-half the minimum explosive concentration for the material being applied. Nondeposited, air-suspended powders shall be removed through exhaust ducts to the powder recovery system.

SECTION 2407—ELECTROSTATIC APPARATUS

2407.1 General. Electrostatic apparatus and devices used in connection with paint-spraying and paint-detearing operations shall be of an approved type.

2407.2 Location and clear space. A space of not less than twice the sparking distance shall be maintained between goods being painted or deteared and electrodes, electrostatic atomizing heads or conductors. *The equipment manufacturer's operating instructions shall be consulted to determine the sparking distance of the equipment involved.* A sign stating the sparking distance shall be conspicuously posted near the assembly.

Exception: Portable electrostatic paint-spraying apparatus listed for use in Class I, Division 1, locations.

2407.3 Construction of equipment. Electrodes and electrostatic atomizing heads shall be of approved construction, rigidly supported in permanent locations and effectively insulated from ground. Insulators shall be nonporous and noncombustible.

Exception: Portable electrostatic paint-spraying apparatus listed for use in Class I, Division 1, locations.

2407.3.1 Barriers. Booths, fencing, railings or guards shall be placed about the equipment such that either by their location or character, or both, isolation of the process is maintained from plant storage and personnel. Railings, fencing and guards shall be of conductive material, adequately grounded, and not less than 5 feet (1524 mm) from processing equipment.

Exception: Portable electrostatic paint-spraying apparatus listed for use in Class I, Division 1, locations.

2407.4 Fire protection. Areas used for electrostatic spray finishing with fixed equipment shall be protected with an approved automatic fire-extinguishing system complying with Chapter 9 and Section 2407.4.1.

2407.4.1 Protection for automated liquid electrostatic spray application equipment. Automated liquid electrostatic spray application equipment shall be protected by the installation of an approved, supervised flame detection apparatus that shall, in the event of ignition, react to the presence of flame within 0.5 second and shall accomplish all of the following:

1. Activation of a local alarm in the vicinity of the spraying operation and activation of the building alarm system, if such a system is provided.
2. Shutting down of the coating material delivery system.
3. Termination of all spray application operations.
4. Stopping of conveyors into and out of the flammable vapor areas.
5. Disconnection of power to the high-voltage elements in the flammable vapor areas and disconnection of power to the system.

2407.5 Housekeeping, maintenance and storage of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3, 2403.4 and Sections 2407.5.1 and 2407.5.2.

2407.5.1 Maintenance. Insulators shall be kept clean and dry. Drip plates and screens subject to paint deposits shall be removable and taken to a safe place for cleaning. Grounds and bonding means for the paint-spraying apparatus and all associated equipment shall be periodically cleaned and maintained free of overspray.

2407.5.2 Signs. Signs shall be posted to provide the following information:

1. Designate the process zone as dangerous with respect to fire and accident.

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2. Identify the grounding requirements for all electrically conductive objects in the flammable vapor area, including persons.
3. Restrict access to qualified personnel only.

2407.6 Sources of ignition. Transformers, power packs, control apparatus and all other electrical portions of the equipment, except high-voltage grids and electrostatic atomizing heads and connections, shall be located outside of the flammable vapor areas or shall comply with Section 2403.2.

2407.7 Ventilation. The flammable vapor area shall be ventilated in accordance with Section 2404.9.

2407.8 Emergency shutdown. Electrostatic apparatus shall be equipped with automatic controls operating without time delay to disconnect the power supply to the high-voltage transformer and signal the operator under any of the following conditions:

1. Stoppage of ventilating fans or failure of ventilating equipment from any cause.
2. Stoppage of the conveyor carrying articles past the high-voltage grid.
3. Occurrence of a ground or an imminent ground at any point of the high-voltage system.
4. Reduction of clearance below that required in Section 2407.2.

2407.9 Ventilation interlock. Hand electrostatic equipment shall be interlocked with the ventilation system for the spraying area so that the equipment cannot be operated unless the ventilating system is in operation.

SECTION 2408—ORGANIC PEROXIDES AND DUAL-COMPONENT COATINGS

2408.1 General. Spraying operations involving the use of organic peroxides and other dual-component coatings shall be in accordance with the requirements of Section 2403 and Sections 2408.2 through 2408.5.

2408.2 Use of organic peroxide coatings. Spraying operations involving the use of organic peroxides and other dual-component coatings shall be conducted in approved sprinklered spray booths complying with Section 2404.5.3.

2408.3 Equipment. Spray guns and related handling equipment used with organic peroxides shall be of a type manufactured for such use.

2408.3.1 Pressure tanks. Separate pressure vessels and inserts specifically for the application shall be used for the resin and for the organic peroxide, and shall not be interchanged. Organic peroxide pressure tank inserts shall be constructed of stainless steel or polyethylene.

2408.4 Housekeeping, maintenance, storage and use of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2408.4.1 through 2408.4.7.

2408.4.1 Contamination prevention. Organic peroxide initiators shall not be contaminated with foreign substances.

2408.4.2 Spilled material. Spilled organic peroxides shall be promptly removed and any residue thereof promptly eliminated. Spilled material absorbed by using a noncombustible absorbent shall be promptly disposed of in accordance with the manufacturer's recommendation.

2408.4.3 Residue control. Materials shall not be contaminated by dusts and overspray residues resulting from the sanding or spraying of finishing materials containing organic peroxides.

2408.4.4 Handling. Handling of organic peroxides shall be conducted in a manner that avoids shock and friction that produces decomposition and violent reaction hazards.

2408.4.5 Mixing. Organic peroxides shall not be mixed directly with accelerators or promoters.

2408.4.6 Personnel qualifications. Personnel working with organic peroxides and dual-component coatings shall be specifically trained to work with these materials.

2408.4.7 Storage. The storage of organic peroxides shall comply with Chapter 62.

2408.5 Sources of ignition. Only nonsparking tools shall be used in areas where organic peroxides are stored, mixed or applied.

SECTION 2409—INDOOR MANUFACTURING OF REINFORCED PLASTICS

2409.1 General. Indoor manufacturing processes involving spray or hand application of reinforced plastics and using more than 5 gallons (19 L) of resin in a 24-hour period shall be in accordance with Sections 2409.2 through 2409.6.1.

2409.2 Resin application equipment. Equipment used for spray application of resin shall be installed and used in accordance with Section 2408 and Sections 2409.3 through 2409.6.1.

2409.3 Fire protection. Resin application areas shall be protected by an automatic sprinkler system. The sprinkler system design shall be not less than that required for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (279 m^2). Where the materials or storage arrangements are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

2409.4 Housekeeping, maintenance, storage and use of hazardous materials. Housekeeping, maintenance, storage and use of hazardous materials shall be in accordance with Sections 2403.3 and 2403.4 and Sections 2409.4.1 through 2409.4.3.

2409.4.1 Handling of excess catalyzed resin. A noncombustible, open-top container shall be provided for disposal of excess catalyzed resin. Excess catalyzed resin shall be drained into the container while still in the liquid state. Enough water shall be provided in the container to maintain a minimum 2-inch (51 mm) water layer over the contained resin.

2409.4.2 Control of overchop. In areas where chopper guns are used, exposed wall and floor surfaces shall be covered with paper, polyethylene film or other approved material to allow for removal of overchop. Overchop shall be allowed to cure for not less than 4 hours prior to removal.

2409.4.2.1 Disposal. Following removal, used wall and floor covering materials required by Section 2409.4.2 shall be placed in a noncombustible container and removed from the facility.

2409.4.3 Storage and use of hazardous materials. Storage and use of organic peroxides shall be in accordance with Section 2408 and Chapter 62. Storage and use of flammable and combustible liquids shall be in accordance with Chapter 57. Storage and use of unstable (reactive) materials shall be in accordance with Chapter 66.

2409.5 Sources of ignition in resin application areas. Sources of ignition in resin application areas shall comply with Section 2403.2.

2409.6 Ventilation. Mechanical ventilation shall be provided throughout resin application areas in accordance with Section 2404.9. The ventilation rate shall be adequate to maintain the concentration of flammable vapors in the resin application area at or below 25 percent of the LFL.

Exception: Mechanical ventilation is not required for buildings that have 75 percent of the perimeter unenclosed.

2409.6.1 Local ventilation. Local ventilation shall be provided inside of workpieces where personnel will be under or inside of the workpiece.

SECTION 2410—FLOOR SURFACING AND FINISHING OPERATIONS

2410.1 Scope. Floor surfacing and finishing operations exceeding 350 square feet (33 m^2) and using Class I or II liquids shall comply with Sections 2410.2 through 2410.5.

2410.2 Mechanical system operation. Heating, ventilation and air-conditioning systems shall not be operated during resurfacing or refinishing operations or within 4 hours of the application of flammable or combustible liquids.

2410.3 Business operation. Floor surfacing and finishing operations shall not be conducted while an establishment is open to the public.

2410.4 Ignition sources. The power shall be shut down to all electrical sources of ignition within the flammable vapor area, unless those devices are classified for use in Class I, Division 1, hazardous locations.

2410.5 Ventilation. To prevent the accumulation of flammable vapors, mechanical ventilation at a minimum rate of 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of area being finished shall be provided. Such exhaust shall be by approved temporary or portable means. Vapors shall be exhausted to the exterior of the building.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 25 – FRUIT AND CROP RIPENING

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

25

FRUIT AND CROP RIPENING

User notes:

About this chapter: Chapter 25 provides guidance that is intended to reduce the likelihood of explosions resulting from improper use or handling of ethylene gas used for crop ripening and coloring processes. This is accomplished by regulating ethylene gas generation, regulating storage and distribution systems and controlling ignition sources. Design and construction of facilities for fruit and crop ripening are regulated by the *California Building Code* to reduce the impact of potential accidents to people and buildings.

SECTION 2501—GENERAL

2501.1 Scope. Ripening processes where ethylene gas is introduced into a room to promote the ripening of fruits, vegetables and other crops shall comply with this chapter.

Exception: Mixtures of ethylene and one or more inert gases in concentrations that prevent the gas from reaching greater than 25 percent of the lower explosive limit (LEL) when released to the atmosphere.

2501.2 Permits. Permits shall be required as set forth in Section 105.5.

2501.3 Ethylene generators. Approved ethylene generators shall be operated and maintained in accordance with Section 2506.

SECTION 2502—DEFINITIONS

2502.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 2503—ETHYLENE GAS

2503.1 Location. Ethylene gas shall be discharged only into approved rooms or enclosures designed and constructed for this purpose.

2503.2 Dispensing. Valves controlling discharge of ethylene shall provide positive and fail-closed control of flow and shall be set to limit the concentration of gas in air below 1,000 parts per million (ppm).

SECTION 2504—SOURCES OF IGNITION

2504.1 Ignition prevention. Sources of ignition shall be controlled or protected in accordance with this section and Chapter 3.

2504.2 Electrical wiring and equipment. Electrical wiring and equipment, including luminaires, shall be approved for use in Class I, Division 2, Group C hazardous (classified) locations.

2504.3 Static electricity. Containers, piping and equipment used to dispense ethylene shall be bonded and grounded to prevent the discharge of static sparks or arcs.

2504.4 Lighting. Lighting shall be by approved electric lamps or luminaires only.

2504.5 Heating. Heating shall be by indirect means utilizing low-pressure steam, hot water or warm air.

Exception: Electric or fuel-fired heaters approved for use in hazardous (classified) locations and that are installed and operated in accordance with the applicable provisions of *the California Electrical Code,* the *California Mechanical Code* or the *California Plumbing Code*.

SECTION 2505—COMBUSTIBLE WASTE

2505.1 Housekeeping. Empty boxes, cartons, pallets and other combustible waste shall be removed from ripening rooms or enclosures and disposed of at regular intervals in accordance with Chapter 3.

SECTION 2506—ETHYLENE GENERATORS

2506.1 Ethylene generators. Ethylene generators shall be listed and labeled by an approved testing laboratory, approved by the fire code official and used only in approved rooms in accordance with the ethylene generator manufacturer's instructions. The listing evaluation shall include documentation that the concentration of ethylene gas does not exceed 25 percent of the lower explosive limit (LEL).

2506.2 Ethylene generator rooms. Ethylene generators shall be used in rooms having a volume of not less than 1,000 cubic feet (28 m^3). Rooms shall have air circulation to ensure even distribution of ethylene gas and shall be free from sparks, open flames or other ignition sources.

SECTION 2507—WARNING SIGNS

2507.1 Where required. Approved warning signs indicating the danger involved and necessary precautions shall be posted on all doors and entrances to the premises.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 26 – FUMIGATION AND INSECTICIDAL FOGGING

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
26
FUMIGATION AND INSECTICIDAL FOGGING

User notes:

About this chapter: Chapter 26 regulates fumigation and insecticidal fogging operations that use toxic pesticide chemicals to kill insects, rodents and other vermin. Fumigants and insecticidal fogging agents pose little hazard if properly applied; however, the inherent toxicity of all these agents and the potential flammability of some make special precautions necessary when they are used. Requirements of this chapter are intended to protect both the public and firefighters from hazards associated with these products.

SECTION 2601—GENERAL

2601.1 Scope. Fumigation and insecticidal fogging operations within buildings, structures and spaces shall comply with this chapter.

2601.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 2602—DEFINITIONS

2602.1 Definitions. The following terms are defined in Chapter 2:

FUMIGANT.

FUMIGATION.

INSECTICIDAL FOGGING.

SECTION 2603—FIRE SAFETY REQUIREMENTS

2603.1 General. Buildings, structures and spaces in which fumigation and insecticidal fogging operations are conducted shall comply with the fire protection and safety requirements of Sections 2603.2 through 2603.7.

2603.2 Sources of ignition. Fires, open flames and similar sources of ignition shall be eliminated from the space under fumigation or insecticidal fogging. Heating, where needed, shall be of an approved type.

2603.2.1 Electricity. Electricity in any part of the building, structure or space where operation of switches or electrical devices, equipment or systems could serve as a source of ignition shall be shut off.

Exception: Circulating fans that have been specifically designed for utilization in hazardous atmospheres and installed in accordance with *the California Electrical Code.*

2603.2.2 Electronic devices. Electronic devices, including portable equipment and cellular phones, shall be shut off. Telephone lines shall be disconnected from telephones.

2603.2.3 Duration. Sources of ignition shall be shut off during the fumigation activity and remain shut off until the ventilation required in Section 2603.6 is completed.

2603.3 Notification. The fire code official and fire chief shall be notified in writing not less than 48 hours before the building, structure or space is to be closed in connection with the utilization of any toxic or flammable fumigant. Notification shall give the location of the enclosed space to be fumigated or fogged, the occupancy, the fumigants or insecticides to be utilized, the person or persons responsible for the operation, and the date and time at which the operation will begin. Written notice of any fumigation or insecticidal fogging operation shall be given to all affected occupants of the building, structure or space in which such operations are to be conducted with sufficient advance notice to allow the occupants to evacuate the building, structure or space. Such notice shall inform the occupants as to the purposes, anticipated duration and hazards associated with the fumigation or insecticidal fogging operation.

2603.3.1 Warning signs. Approved warning signs indicating the danger, type of chemical involved and necessary precautions shall be posted on all doors and entrances to the affected building, structure or space and on all gangplanks and ladders from the deck, pier or land to a ship. Such notices shall be printed in red ink on a white background. Letters in the headlines shall be not less than 2 inches (51 mm) in height and shall state the date and time of the operation, the name and address of the person, the name of the operator in charge, and a warning stating that the affected building, structure or space shall be vacated not less than 1 hour before the operation begins and shall not be reentered until the danger signs have been removed by the proper authorities.

2603.3.2 Breathing apparatus. Persons engaged in the business of fumigation or insecticidal fogging shall maintain and have available approved protective breathing apparatus.

2603.3.3 Watch personnel. During the period fumigation is in progress, except where fumigation is conducted in a gastight vault or tank, a responsible watchperson shall remain on duty at the entrance or entrances to the enclosed fumigated space until after the fumigation is completed and the building, structure or space is properly ventilated and safe for occupancy. Sufficient watchers shall be provided to prevent persons from entering the enclosed space under fumigation without being observed.

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2603.3.4 Evacuation during fumigation. Occupants of the building, structure or space to be fumigated, except the personnel conducting the fumigation, shall be evacuated from such building, structure or space prior to commencing fumigation operations.

2603.3.5 Evacuation during insecticidal fogging operations. Occupants in the building, structure or space to be fogged, except the personnel conducting the insecticidal fogging operations, shall be evacuated from such building, structure or space prior to commencing fogging operations.

2603.4 Insecticidal fogging liquids. Insecticidal fogging liquids with a flash point below 100°F (38°C) shall not be utilized.

2603.5 Sealing of buildings, structures and spaces. Paper and other similar materials that do not meet the flame propagation performance criteria of Test Method 1 or Test Method 2, as appropriate, of NFPA 701 shall not be used to wrap or cover a building, structure or space in excess of that required for the sealing of cracks, casements and similar openings.

2603.5.1 Maintenance of openings. All openings to the building, structure or space to be fumigated or fogged shall be kept securely closed during such operation.

2603.6 Venting and cleanup. At the end of the exposure period, fumigators shall safely and properly ventilate the premises and contents; properly dispose of fumigant containers, residues, debris and other materials used for such fumigation; and clear obstructions from gas-fired appliance vents.

2603.7 Flammable fumigants restricted. The use of carbon disulfide and hydrogen cyanide shall be restricted to agricultural fumigation.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 27 – SEMICONDUCTOR FABRICATION FACILITIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

27

SEMICONDUCTOR FABRICATION FACILITIES

User notes:

About this chapter: Chapter 27 provides requirements that are intended to control hazards associated with the manufacture of electrical circuit boards or microchips, commonly called semiconductors. Though the finished product possesses no unusual hazards, materials commonly associated with semiconductor manufacturing are often quite hazardous and include flammable liquids, pyrophoric and flammable gases, toxic substances and corrosives. The requirements of this chapter are concerned with both life safety and property protection. However, the fire code official should recognize that the risk of extraordinary property damages is far more common than the risk of personal injuries from fire. Section 415.11 of the *California Building Code* also addresses these facilities that are classified as Group H-5 occupancies.

SECTION 2701—GENERAL

2701.1 Scope. Semiconductor fabrication facilities and comparable research and development areas classified as Group H-5 shall comply with this chapter and the *California Building Code*. The use, storage and handling of hazardous materials in Group H-5 shall comply with this chapter, other applicable provisions of this code and the *California Building Code*.

2701.2 Application. The requirements set forth in this chapter are requirements specific only to Group H-5 and shall be applied as exceptions or additions to applicable requirements set forth elsewhere in this code.

2701.3 Multiple hazards. Where a material poses multiple hazards, all hazards shall be addressed in accordance with Section 5001.1.

2701.4 Existing buildings and existing fabrication areas. Existing buildings and existing fabrication areas shall comply with this chapter, except that transportation and handling of HPM in corridors and enclosures for stairways and ramps shall be allowed where in compliance with Section 2705.3.2 and the *California Building Code*.

2701.5 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 2702—DEFINITIONS

2702.1 Definitions. The following terms are defined in Chapter 2:

EMERGENCY CONTROL STATION.

FABRICATION AREA.

GAS DETECTION SYSTEM.

HAZARDOUS PRODUCTION MATERIAL (HPM).

HPM.

HPM ROOM.

PASS-THROUGH.

SEMICONDUCTOR FABRICATION FACILITY.

SERVICE CORRIDOR.

TOOL.

WORKSTATION.

SECTION 2703—GENERAL SAFETY PROVISIONS

2703.1 Emergency control station. An emergency control station shall be provided in accordance with Sections 2703.1.1 through 2703.1.3.

2703.1.1 Location. The emergency control station shall be located on the premises at an approved location outside the fabrication area.

2703.1.2 Staffing. Trained personnel shall continuously staff the emergency control station.

2703.1.3 Signals. The emergency control station shall receive signals from emergency equipment and alarm and detection systems. Such emergency equipment and alarm and detection systems shall include, but not be limited to, the following where such equipment or systems are required to be provided either in this chapter or elsewhere in this code:

1. Automatic sprinkler system alarm and monitoring systems.
2. Manual fire alarm systems.
3. Emergency alarm systems.
4. Gas detection systems.
5. Smoke detection systems.
6. Emergency power systems.

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7. Automatic detection and alarm systems for pyrophoric liquids and Class 3 water-reactive liquids required by Section 2705.2.3.4.
8. Exhaust ventilation flow alarm devices for pyrophoric liquids and Class 3 water-reactive liquids and cabinet exhaust ventilation systems required by Section 2705.2.3.4.

2703.2 Systems, equipment and processes. Systems, equipment and processes shall be in accordance with Sections 2703.2.1 through 2703.2.3.2.

2703.2.1 Application. Systems, equipment and processes shall include, but not be limited to, containers, cylinders, tanks, piping, tubing, valves and fittings.

2703.2.2 General requirements. In addition to the requirements in Section 2703.2, systems, equipment and processes shall comply with Section 5003.2, other applicable provisions of this code, the *California Building Code* and the *California Mechanical Code*.

2703.2.3 Additional requirements for HPM supply piping. In addition to the requirements in Section 2703.2, HPM supply piping and tubing for HPM gases and liquids shall comply with this section.

2703.2.3.1 General requirements. The requirements set forth in Section 5003.2.2.2 shall apply to supply piping and tubing for HPM gases and liquids.

2703.2.3.2 Health-hazard ranking 3 or 4 HPM. Supply piping and tubing for HPM gases and liquids having a health-hazard ranking of 3 or 4 shall be welded throughout, except for connections located within a ventilation enclosure if the material is a gas, or an approved method of drainage or containment provided for connections if the material is a liquid.

2703.3 Construction requirements. Construction of semiconductor fabrication facilities shall be in accordance with Sections 2703.3.1 through 2703.3.9.

2703.3.1 Fabrication areas. Construction and location of fabrication areas shall comply with the *California Building Code*.

2703.3.2 Pass-throughs in exit access corridors. Pass-throughs in exit access corridors shall be constructed in accordance with the *California Building Code*.

2703.3.3 Liquid storage rooms. Liquid storage rooms shall comply with Chapter 57 and the *California Building Code*.

2703.3.4 HPM rooms. HPM rooms shall comply with the *California Building Code*.

2703.3.5 Gas cabinets. Gas cabinets shall comply with Section 5003.8.6.

2703.3.6 Exhausted enclosures. Exhausted enclosures shall comply with Section 5003.8.5.

2703.3.7 Gas rooms. Gas rooms shall comply with Section 5003.8.4.

2703.3.8 Service corridors. Service corridors shall comply with Section 2705.3 and the *California Building Code*.

2703.3.9 Cabinets containing pyrophoric liquids or water-reactive Class 3 liquids. Cabinets in fabrication areas containing pyrophoric liquids or Class 3 water-reactive liquids in containers or in amounts greater than $^{1}/_{2}$ gallon (2 L) shall comply with Section 2705.2.3.4.

2703.4 Emergency plan. An emergency plan shall be established as set forth in Section 403.6.1.

2703.5 Maintenance of equipment, machinery and processes. Maintenance of equipment, machinery and processes shall comply with Section 5003.2.6.

2703.6 Security of areas. Areas shall be secured in accordance with Section 5003.9.2.

2703.7 Electrical wiring and equipment. Electrical wiring and equipment in HPM facilities shall comply with Sections 2703.7.1 through 2703.7.3.

2703.7.1 Fabrication areas. Electrical wiring and equipment in fabrication areas shall comply with *the California Electrical Code.*

2703.7.2 Workstations. Electrical equipment and devices within 5 feet (1524 mm) of workstations in which flammable or pyrophoric gases or flammable liquids are used shall comply with *the California Electrical Code* for Class I, Division 2 hazardous locations. Workstations shall not be energized without adequate exhaust ventilation in accordance with Section 2703.14.

Exception: Class I, Division 2 hazardous electrical equipment is not required where the air removal from the workstation or dilution will prevent the accumulation of flammable vapors and fumes on a continuous basis.

2703.7.3 Hazardous production material (HPM) rooms, gas rooms and liquid storage rooms. Electrical wiring and equipment in HPM rooms, gas rooms and liquid storage rooms shall comply with *the California Electrical Code.*

2703.8 Corridors and enclosures for stairways and ramps. Hazardous materials shall not be used or stored in corridors or enclosures for stairways and ramps.

2703.9 Service corridors. Hazardous materials shall not be used in an open-system use condition in service corridors.

2703.10 Automatic sprinkler system. An approved automatic sprinkler system shall be provided in accordance with Sections 2703.10.1 through 2703.10.5 and Chapter 9.

2703.10.1 Workstations and tools. The design of the sprinkler system in the area shall take into consideration the spray pattern and the effect on the equipment.

2703.10.1.1 Combustible workstations. A sprinkler head shall be installed within each branch exhaust connection or individual plenums of workstations of combustible construction. The sprinkler head in the exhaust connection or plenum shall be

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located not more than 2 feet (610 mm) from the point of the duct connection or the connection to the plenum. Where necessary to prevent corrosion, the sprinkler head and connecting piping in the duct shall be coated with approved or listed corrosion-resistant materials. Access to the sprinkler head shall be provided for periodic inspection.

Exceptions:

1. Approved alternative automatic fire-extinguishing systems are allowed. Activation of such systems shall deactivate the related processing equipment.
2. Process equipment that operates at temperatures exceeding 932°F (500°C) and is provided with automatic shutdown capabilities for hazardous materials.
3. Exhaust ducts 10 inches (254 mm) or less in diameter from flammable gas storage cabinets that are part of a workstation.
4. Ducts listed or approved for use without internal automatic sprinkler protection.

2703.10.1.2 Combustible tools. Where the horizontal surface of a combustible tool is obstructed from ceiling sprinkler discharge, automatic sprinkler protection that covers the horizontal surface of the tool shall be provided.

Exceptions:

1. An automatic gaseous fire-extinguishing local surface application system shall be allowed as an alternative to sprinklers. Gaseous-extinguishing systems shall be actuated by infrared (IR) or ultraviolet/infrared (UV/IR) optical detectors.
2. Tools constructed of materials that are listed as Class 1 or Class 2 in accordance with UL 2360 or approved for use without internal fire-extinguishing system protection.

2703.10.2 Gas cabinets and exhausted enclosures. An approved automatic sprinkler system shall be provided in gas cabinets and exhausted enclosures containing HPM compressed gases.

Exception: Gas cabinets located in an HPM room other than those cabinets containing pyrophoric gases.

2703.10.3 Pass-throughs in existing exit access corridors. Pass-throughs in existing exit access corridors shall be protected by an approved automatic sprinkler system.

2703.10.4 Exhaust ducts for HPM. An approved automatic sprinkler system shall be provided in exhaust ducts conveying gases, vapors, fumes, mists or dusts generated from HPM in accordance with this section and the *California Mechanical Code*.

2703.10.4.1 Metallic and noncombustible nonmetallic exhaust ducts. An approved automatic sprinkler system shall be provided in metallic and noncombustible nonmetallic exhaust ducts where all of the following conditions apply:

1. Where the largest cross-sectional diameter is equal to or greater than 10 inches (254 mm).
2. The ducts are within the building.
3. The ducts are conveying flammable gases, vapors or fumes.

2703.10.4.2 Combustible nonmetallic exhaust ducts. An approved automatic sprinkler system shall be provided in combustible nonmetallic exhaust ducts where the largest cross-sectional diameter of the duct is equal to or greater than 10 inches (254 mm).

Exceptions:

1. Ducts listed or approved for applications without automatic sprinkler system protection.
2. Ducts not more than 12 feet (3658 mm) in length installed below ceiling level.

2703.10.4.3 Exhaust connections and plenums of combustible workstations. Automatic fire-extinguishing system protection for exhaust connections and plenums of combustible workstations shall comply with Section 2703.10.1.1.

2703.10.4.4 Exhaust duct sprinkler system requirements. Automatic sprinklers installed in exhaust duct systems shall be hydraulically designed to provide 0.5 gallon per minute (gpm) (1.9 L/min) over an area derived by multiplying the distance between the sprinklers in a horizontal duct by the width of the duct. Minimum discharge shall be 20 gpm (76 L/min) per sprinkler from the five hydraulically most remote sprinklers.

2703.10.4.4.1 Sprinkler locations. Automatic sprinklers shall be installed at 12-foot (3658 mm) intervals in horizontal ducts and at changes in direction. In vertical runs, automatic sprinklers shall be installed at the top and at alternate floor levels.

2703.10.4.4.2 Control valve. A separate indicating control valve shall be provided for sprinklers installed in exhaust ducts.

2703.10.4.4.3 Drainage. Drainage shall be provided to remove sprinkler water discharged in exhaust ducts.

2703.10.4.4.4 Corrosive atmospheres. Where corrosive atmospheres exist, exhaust duct sprinklers and pipe fittings shall be manufactured of corrosion-resistant materials or coated with approved materials.

2703.10.4.4.5 Maintenance and inspection. Access to sprinklers in exhaust ducts shall be provided for periodic inspection and maintenance.

2703.10.5 Sprinkler alarms and supervision. Automatic sprinkler systems shall be electrically supervised and provided with alarms in accordance with Chapter 9. Automatic sprinkler system alarm and supervisory signals shall be transmitted to the emergency control station.

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2703.11 Manual fire alarm system. A manual fire alarm system shall be installed throughout buildings containing a Group H-5 occupancy. Activation of the alarm system shall initiate a local alarm and transmit a signal to the emergency control station. Manual fire alarm systems shall be designed and installed in accordance with Section 907.

2703.12 Emergency alarm system. Emergency alarm systems shall be provided in accordance with Sections 2703.12.1 through 2703.12.3, Section 5004.9 and Section 5005.4.4. The maximum allowable quantity per control area provisions of Section 5004.1 shall not apply to emergency alarm systems required for HPM.

2703.12.1 Where required. Emergency alarm systems shall be provided in the areas indicated in Sections 2703.12.1.1 through 2703.12.1.3.

2703.12.1.1 Service corridors. An approved emergency alarm system shall be provided in service corridors, with not less than one alarm device in the service corridor.

2703.12.1.2 Corridors and interior exit stairways and ramps. Emergency alarms for corridors, interior exit stairways and ramps and exit passageways shall comply with Section 5005.4.4.

2703.12.1.3 Liquid storage rooms, HPM rooms and gas rooms. Emergency alarms for liquid storage rooms, HPM rooms and gas rooms shall comply with Section 5004.9.

2703.12.2 Alarm-initiating devices. An approved emergency telephone system, local alarm manual pull stations, or other approved alarm-initiating devices are allowed to be used as emergency alarm-initiating devices.

2703.12.3 Alarm signals. Activation of the emergency alarm system shall sound a local alarm and transmit a signal to the emergency control station.

2703.13 Gas detection systems. A gas detection system complying with Section 916 shall be provided for HPM gases where the physiological warning threshold level of the gas is at a higher level than the accepted permissible exposure limit (PEL) for the gas and for flammable gases in accordance with Sections 2703.13.1 through 2703.13.2.2.

2703.13.1 Where required. A gas detection system shall be provided in the areas identified in Sections 2703.13.1.1 through 2703.13.1.4.

2703.13.1.1 Fabrication areas. A gas detection system shall be provided in fabrication areas where HPM gas is used in the fabrication area.

2703.13.1.2 HPM rooms. A gas detection system shall be provided in HPM rooms where HPM gas is used in the room.

2703.13.1.3 Gas cabinets, exhausted enclosures and gas rooms. A gas detection system shall be provided in gas cabinets and exhausted enclosures for HPM gas. A gas detection system shall be provided in gas rooms where HPM gases are not located in gas cabinets or exhausted enclosures.

2703.13.1.4 Corridors. Where HPM gases are transported in piping placed within the space defined by the walls of a corridor and the floor or roof above the corridor, a gas detection system shall be provided where piping is located and in the corridor.

Exception: A gas detection system is not required for occasional transverse crossings of the corridors by supply piping that is enclosed in a ferrous pipe or tube for the width of the corridor.

2703.13.2 Gas detection system operation. The gas detection system shall be capable of monitoring the room, area or equipment in which the HPM gas is located at or below all the following gas concentrations:

1. Immediately dangerous to life and health (IDLH) values where the monitoring point is within an exhausted enclosure, ventilated enclosure or gas cabinet.
2. Permissible exposure limit (PEL) levels where the monitoring point is in an area outside an exhausted enclosure, ventilated enclosure or gas cabinet.
3. For flammable gases, the monitoring detection threshold level shall be vapor concentrations in excess of 25 percent of the lower flammable limit (LFL) where the monitoring is within or outside an exhausted enclosure, ventilated enclosure or gas cabinet.
4. Except as noted in this section, monitoring for highly toxic and toxic gases shall also comply with Chapter 60.

2703.13.2.1 Alarms. The gas detection system shall initiate a local alarm and transmit a signal to the emergency control station when a short-term hazard condition is detected. The alarm shall be both visible and audible and shall provide warning both inside and outside the area where the gas is detected. The audible alarm shall be distinct from all other alarms.

2703.13.2.2 Shut off of gas supply. The gas detection system shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for which gas is detected when a short-term hazard condition is detected. Automatic closure of shutoff valves shall comply with the following:

1. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.
2. Where the gas-detection sampling point initiating the gas detection system alarm is within a room and compressed gas containers are not in gas cabinets or exhausted enclosure, the shutoff valves on all gas lines for the specific gas detected shall automatically close.

3. Where the gas-detection sampling point initiating the gas detection system alarm is within a piping distribution manifold enclosure, the shutoff valve supplying the manifold for the compressed gas container of the specific gas detected shall automatically close.

Exception: Where the gas-detection sampling point initiating the gas detection system alarm is at the use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve for the branch line located in the piping distribution manifold enclosure shall automatically close.

2703.14 Exhaust ventilation systems for HPM. Exhaust ventilation systems and materials for exhaust ducts utilized for the exhaust of HPM shall comply with Sections 2703.14.1 through 2703.14.3, other applicable provisions of this code, the *California Building Code* and the *California Mechanical Code*.

2703.14.1 Where required. Exhaust ventilation systems shall be provided in the following locations in accordance with the requirements of this section and the *California Building Code*:

1. Fabrication areas: Exhaust ventilation for fabrication areas shall comply with the *California Building Code*. The *fire code official* is authorized to require additional manual control switches.
2. Workstations: A ventilation system shall be provided to capture and exhaust gases, fumes and vapors at workstations.
3. Liquid storage rooms: Exhaust ventilation for liquid storage rooms shall comply with Section 5004.3.1 and the *California Building Code*.
4. HPM rooms: Exhaust ventilation for HPM rooms shall comply with Section 5004.3.1 and the *California Building Code*.
5. Gas cabinets: Exhaust ventilation for gas cabinets shall comply with Section 5003.8.6.2. The gas cabinet ventilation system is allowed to connect to a workstation ventilation system. Exhaust ventilation for gas cabinets containing highly toxic or toxic gases shall also comply with Chapter 60.
6. Exhausted enclosures: Exhaust ventilation for exhausted enclosures shall comply with Section 5003.8.5.2. Exhaust ventilation for exhausted enclosures containing highly toxic or toxic gases shall also comply with Chapter 60.
7. Gas rooms: Exhaust ventilation for gas rooms shall comply with Section 5003.8.4.2. Exhaust ventilation for gas rooms containing highly toxic or toxic gases shall also comply with Chapter 60.
8. Cabinets containing pyrophoric liquids or Class 3 water-reactive liquids: Exhaust ventilation for cabinets in fabrication areas containing pyrophoric liquids or Class 3 water-reactive liquids shall be as required in Section 2705.2.3.4.

2703.14.2 Penetrations. Exhaust ducts penetrating fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code* shall be contained in a shaft of equivalent fire-resistance-rated construction. Exhaust ducts shall not penetrate fire walls. Fire dampers shall not be installed in exhaust ducts.

2703.14.3 Treatment systems. Treatment systems for highly toxic and toxic gases shall comply with Chapter 60.

2703.15 Emergency power system. An emergency power system shall be provided in Group H-5 occupancies in accordance with Section 1203. The emergency power system shall supply power automatically to the electrical systems specified in Section 2703.15.1 when the normal supply system is interrupted.

2703.15.1 Required electrical systems. Emergency power shall be provided for electrically operated equipment and connected control circuits for the following systems:

1. HPM exhaust ventilation systems.
2. HPM gas cabinet ventilation systems.
3. HPM exhausted enclosure ventilation systems.
4. HPM gas room ventilation systems.
5. HPM gas detection systems.
6. Emergency alarm systems.
7. Manual fire alarm systems.
8. Automatic sprinkler system monitoring and alarm systems.
9. Automatic alarm and detection systems for pyrophoric liquids and Class 3 water-reactive liquids required in Section 2705.2.3.4.
10. Flow alarm switches for pyrophoric liquids and Class 3 water-reactive liquids cabinet exhaust ventilation systems required in Section 2705.2.3.4.
11. Electrically operated systems required elsewhere in this code or in the *California Building Code* applicable to the use, storage or handling of HPM.

2703.15.2 Exhaust ventilation systems. Exhaust ventilation systems are allowed to be designed to operate at not less than one-half the normal fan speed on the emergency power system where it is demonstrated that the level of exhaust will maintain a safe atmosphere.

2703.16 Sub-atmospheric pressure gas systems. Sub-atmospheric pressure gas systems (SAGS) shall be in accordance with NFPA 318.

SECTION 2704—STORAGE

2704.1 General. Storage of hazardous materials shall comply with Section 2703 and this section and other applicable provisions of this code.

2704.2 Fabrication areas. Hazardous materials storage and the maximum quantities of hazardous materials in use and storage allowed in *fabrication areas* shall be in accordance with Sections 2704.2.1 through 2704.2.2.1.

2704.2.1 Location of HPM storage in fabrication areas. Storage of HPM in fabrication areas shall be within approved or listed storage cabinets, gas cabinets, exhausted enclosures or within a workstation as follows:

1. Flammable and combustible liquid storage cabinets shall comply with Section 5704.3.2.
2. Hazardous materials storage cabinets shall comply with Section 5003.8.7.
3. Gas cabinets shall comply with Section 5003.8.6. Gas cabinets for highly toxic or toxic gases shall also comply with Section 6004.1.2.
4. Exhausted enclosures shall comply with Section 5003.8.5. Exhausted enclosures for highly toxic or toxic gases shall also comply with Section 6004.1.3.
5. Workstations shall comply with Section 2705.2.3.

2704.2.2 Maximum aggregate quantities in fabrication areas. The aggregate quantities of hazardous materials stored or used in a single fabrication area shall be limited as specified in this section.

Exception: Fabrication areas containing quantities of hazardous materials not exceeding the maximum allowable quantities per control area established by Sections 5003.1.1, 5704.3.4 and 5704.3.5.

2704.2.2.1 Storage and use in fabrication areas. The maximum quantities of hazardous materials stored or used in a single fabrication area shall not exceed the quantities set forth in Table 2704.2.2.1.

TABLE 2704.2.2.1—QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]

HAZARD CATEGORY	SOLIDS (pounds per square foot)	LIQUIDS (gallons per square foot)	GAS (cubic feet @ NTP per square foot)
Physical-Hazard Materials			
Combustible dust	Note b	Not Applicable	Not Applicable
Combustible fiber Loose Baled	 Note b Notes b and c	Not Applicable	Not Applicable
Combustible liquid Class II Class IIIA Class IIIB Combination Class I, II and IIIA	Not Applicable	 0.02 0.04 Not Limited 0.08	Not Applicable
Cryogenic gas Flammable Oxidizing	Not Applicable	Not Applicable	 Note d 2.5
Explosives	Note b	Note b	Note b
Flammable gas Gaseous Liquefied	Not Applicable	Not Applicable	 Note d Note d
Flammable liquid Class IA Class IB Class IC Combination Class IA, IB and IC Combination Class I, II and IIIA	Not Applicable	 0.005 0.05 0.05 0.05 0.08	Not Applicable
Flammable solid	0.002	Not Applicable	Not Applicable
Organic peroxide Unclassified detonable Class I Class II Class III Class IV Class V	 Note b Note b 0.05 0.2 Not Limited Not Limited	 Note b Note b 0.0025 0.02 Not Limited Not Limited	Not Applicable

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TABLE 2704.2.2.1—QUANTITY LIMITS FOR HAZARDOUS MATERIALS IN A SINGLE FABRICATION AREA IN GROUP H-5[a]—continued			
HAZARD CATEGORY	**SOLIDS (pounds per square foot)**	**LIQUIDS (gallons per square foot)**	**GAS (cubic feet @ NTP per square foot)**
Oxidizing gas Gaseous Liquefied Combination of gaseous and liquefied	Not Applicable	Not Applicable	 2.5 2.5 2.5
Oxidizer Class 4 Class 3 Class 2 Class 1 Combination Class 1, 2, 3	 Note b 0.006 0.006 0.006 0.006	 Note b 0.06 0.06 0.06 0.06	Not Applicable
Pyrophoric materials	Note b	0.0025	Notes d and e
Unstable (reactive) Class 4 Class 3 Class 2 Class 1	 Note b 0.05 0.2 Not Limited	 Note b 0.005 0.02 Not Limited	 Note b Note b Note b Not Limited
Water reactive Class 3 Class 2 Class 1	 0.02[f] 0.5 Not Limited	 0.0025 0.05 Not Limited	Not Applicable
Health-Hazard Materials			
Corrosives	Not Limited	Not Limited	Not Limited
Highly toxic	Not Limited	Not Limited	Note d
Toxics	Not Limited	Not Limited	Note d

For SI: 1 pound = 0.454 kg, 1 pound per square foot = 4.882 kg/m^2, 1 gallon per square foot = 40.7 L/m^2, 1 cubic foot @ NTP/square foot = 0.305 m^3 @ NTP/m^2, 1 cubic foot = 0.02832 m^3.

a. Hazardous materials within piping shall not be included in the calculated quantities.

b. Quantity of hazardous materials in a single fabrication area shall not exceed the maximum allowable quantities per control area in Tables 5003.1.1(1) and 5003.1.1(2).

c. Densely packed baled cotton that complies with the packing requirements of ISO 8115 shall not be included in this material class.

d. The aggregate quantity of flammable, pyrophoric, toxic and highly toxic gases shall not exceed the greater of 0.2 cubic feet at NTP/square foot or 9,000 cubic feet at NTP.

e. The aggregate quantity of pyrophoric gases in the building shall not exceed the amounts set forth in Table 5003.8.2.

f. Quantity of Class 3 water-reactive solids in a single tool shall not exceed 1 pound.

2704.3 Indoor storage outside of fabrication areas. The indoor storage of hazardous materials outside of fabrication areas shall be in accordance with Sections 2704.3.1 through 2704.3.3.

2704.3.1 HPM storage. The indoor storage of HPM in quantities greater than those listed in Sections 5003.1.1 and 5704.3.4 shall be in a room complying with the requirements of the *California Building Code* and this code for a liquid storage room, HPM room or gas room as appropriate for the materials stored.

2704.3.2 Other hazardous materials storage. The indoor storage of other hazardous materials shall comply with Sections 5001, 5003 and 5004 and other applicable provisions of this code.

2704.3.3 Separation of incompatible hazardous materials. Incompatible hazardous materials in storage shall be separated from each other in accordance with Section 5003.9.8.

SECTION 2705—USE AND HANDLING

2705.1 General. The use and handling of hazardous materials shall comply with this section, Section 2703 and other applicable provisions of this code.

2705.2 Fabrication areas. The use of hazardous materials in fabrication areas shall be in accordance with Sections 2705.2.1 through 2705.2.3.4.

2705.2.1 Location of HPM in use in fabrication areas. Hazardous production materials in use in fabrication areas shall be within approved or listed gas cabinets, exhausted enclosures or a workstation.

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2705.2.2 Maximum aggregate quantities in fabrication areas. The aggregate quantities of hazardous materials in a single fabrication area shall comply with Section 2704.2.2 and Table 2704.2.2.1. The quantity of HPM in use at a workstation shall not exceed the quantities listed in Table 2705.2.2.

TABLE 2705.2.2—MAXIMUM QUANTITIES OF HPM AT A WORKSTATION[d]

HPM CLASSIFICATION	STATE	MAXIMUM QUANTITY
Flammable, highly toxic, pyrophoric and toxic combined	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
Flammable	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Corrosive	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 25 gallons[b] Use-closed system: 150 gallons[b, e]
	Solid	20 pounds[a, b]
Highly toxic	Liquid	15 gallons[a, b]
	Solid	5 pounds[a, b]
Oxidizer	Gas	Combined aggregate volume of all cylinders at a workstation shall not exceed an internal cylinder volume of 39.6 gallons or 5.29 cubic feet
	Liquid	Use-open system: 12 gallons[b] Use-closed system: 60 gallons[b]
	Solid	20 pounds[a, b]
Pyrophoric	Liquid	0.5 gallon[c, f]
	Solid	4.4 pounds[c, f]
Toxic	Liquid	Use-open system: 15 gallons[b] Use-closed system: 60 gallons[b]
	Solid	5 pounds[a, b]
Unstable reactive Class 3	Liquid	0.5 gallon[a, b]
	Solid	5 pounds[a, b]
Water-reactive Class 3	Liquid	0.5 gallon[c, f]
	Solid	See Table 2704.2.2.1

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. Maximum allowable quantities shall be increased 100 percent for closed system operations. Where Note b applies, the increase for both notes shall be allowed.

b. Quantities shall be allowed to be increased 100 percent where workstations are internally protected with an *approved* automatic fire-extinguishing or suppression system complying with Chapter 9. Where Note a applies, the increase for both notes shall be allowed. Where Note e applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

c. Allowed only in workstations that are internally protected with an approved automatic fire-extinguishing or fire protection system complying with Chapter 9 and compatible with the reactivity of materials in use at the workstation.

d. The quantity limits apply only to materials classified as HPM.

e. Quantities shall be allowed to be increased 100 percent for nonflammable, noncombustible corrosive liquids where the materials of construction for workstations are listed or approved for use without internal fire-extinguishing or suppression system protection. Where Note b applies, the maximum increase allowed for both Notes b and e shall not exceed 100 percent.

f. A maximum quantity of 5.3 gallons of liquids and 44 pounds of total liquids and solids shall be allowed at a workstation where conditions are in accordance with Section 2705.2.3.4.

2705.2.3 Workstations. Workstations in fabrication areas shall be in accordance with Sections 2705.2.3.1 through 2705.2.3.4.

2705.2.3.1 Construction. Workstations in fabrication areas shall be constructed of materials compatible with the materials used and stored at the workstation. The portion of the workstation that serves as a cabinet for HPM gases, Class I flammable liquids or Class II or Class IIIA combustible liquids shall be noncombustible and, if of metal, shall be not less than 0.0478-inch (18 gage) (1.2 mm) steel.

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2705.2.3.2 Protection of vessels. Vessels containing hazardous materials located in or connected to a workstation shall be protected as follows:

1. HPM: Vessels containing HPM shall be protected from physical damage and shall not project from the workstation.
2. Hazardous cryogenic fluids, gases and liquids: Hazardous cryogenic fluid, gas and liquid vessels located within a workstation shall be protected from seismic forces in an approved manner in accordance with the *California Building Code*.
3. Compressed gases: Protection for compressed gas vessels shall also comply with Section 5303.5.
4. Cryogenic fluids: Protection for cryogenic fluid vessels shall also comply with Section 5503.5.

2705.2.3.3 Drainage and containment for HPM liquids. Each workstation utilizing HPM liquids shall have all of the following:

1. Drainage piping systems connected to a compatible system for disposition of such liquids.
2. The work surface provided with a slope or other means for directing spilled materials to the containment or drainage system.
3. An approved means of containing or directing spilled or leaked liquids to the drainage system.

2705.2.3.4 Pyrophoric solids, liquids and Class 3 water-reactive liquids. Pyrophoric liquids and Class 3 water-reactive liquids in containers greater than 0.5-gallon (2 L) but not exceeding 5.3-gallon (20 L) capacity and pyrophoric solids in containers greater than 4.4 pounds (2 kg) but not exceeding 44 pounds (20 kg) shall be allowed at workstations where located inside cabinets and the following conditions are met:

1. Maximum amount per cabinet: The maximum amount per cabinet shall be limited to 5.3 gallons (20 L) of liquids and 44 pounds (20 kg) of total liquids and solids.
2. Cabinet construction: Cabinets shall be constructed in accordance with the following:
    2.1. Cabinets shall be constructed of not less than 0.097-inch (2.5 mm) (12 gage) steel.
    2.2. Cabinets shall be permitted to have self-closing limited access ports or noncombustible windows that provide access to equipment controls.
    2.3. Cabinets shall be provided with self- or manual-closing doors. Manual-closing doors shall be equipped with a door switch that will initiate local audible and visual alarms when the door is in the open position.
3. Cabinet exhaust ventilation system: An exhaust ventilation system shall be provided for cabinets and shall comply with the following:
    3.1. The system shall be designed to operate at a negative pressure in relation to the surrounding area.
    3.2. The system shall be equipped with monitoring equipment to ensure that required exhaust flow or static pressure is provided.
    3.3. Low-flow or static pressure conditions shall send an alarm to the on-site emergency control station. The alarm shall be both visual and audible.
4. Cabinet spill containment: Spill containment shall be provided in each cabinet, with the spill containment capable of holding the contents of the aggregate amount of liquids in containers in each cabinet.
5. Valves: Valves in supply piping between the product containers in the cabinet and the workstation served by the containers shall fail in the closed position upon power failure, loss of exhaust ventilation and upon actuation of the fire control system.
6. Fire detection system: Each cabinet shall be equipped with an automatic fire detection system complying with the following conditions:
    6.1. Automatic detection system: UV/IR, high-sensitivity smoke detection (HSSD) or other approved detection systems shall be provided inside each cabinet.
    6.2. Automatic shutoff: Activation of the detection system shall automatically close the shutoff valves at the source on the liquid supply.
    6.3. Alarms and signals: Activation of the detection system shall initiate a local alarm within the fabrication area and transmit a signal to the emergency control station. The alarms and signals shall be both visual and audible.

2705.3 Transportation and handling. The transportation and handling of hazardous materials shall comply with Sections 2705.3.1 through 2705.3.4.1 and other applicable provisions of this code.

2705.3.1 Corridors and enclosures for stairways and ramps. Corridors and enclosures for exit stairways and ramps in new buildings or serving new fabrication areas shall not contain HPM, except as permitted in corridors by Section 415.11.7.4 of the *California Building Code* and Section 2705.3.2 of this code.

2705.3.2 Transport in corridors and enclosures for stairways and ramps. Transport in corridors and enclosures for stairways and ramps shall be in accordance with Sections 2705.3.2.1 through 2705.3.3.

2705.3.2.1 Fabrication area alterations. Where existing fabrication areas are altered or modified in existing buildings, HPM is allowed to be transported in existing corridors where such corridors comply with Section 5003.10 of this code and Section 415.11.2 of the *California Building Code*.

2705.3.2.2 HPM transport in corridors and enclosures for stairways and ramps. Nonproduction HPM is allowed to be transported in corridors and enclosures for stairways and ramps where utilized for maintenance, lab work and testing when the transportation is in accordance with Section 5003.10.

2705.3.3 Service corridors. Where a new fabrication area is constructed, a service corridor shall be provided where it is necessary to transport HPM from a liquid storage room, HPM room, gas room or from the outside of a building to the perimeter wall of a fabrication area. Service corridors shall be designed and constructed in accordance with the *California Building Code*.

2705.3.4 Carts and trucks. Carts and trucks used to transport HPM in corridors and enclosures for stairways and ramps shall comply with Section 5003.10.3.

2705.3.4.1 Identification. Carts and trucks shall be marked to indicate the contents.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 28 – LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

28

LUMBER YARDS AND AGRO-INDUSTRIAL, SOLID BIOMASS AND WOODWORKING FACILITIES

User notes:

About this chapter: Chapter 28 provides requirements that are intended to prevent fires and explosions, facilitate fire control and reduce exposures to and from facilities storing, selling or processing wood and forest products, including sawdust, wood chips, shavings, bark mulch, shorts, finished planks, sheets, posts, poles, timber and raw logs and the hazard they represent once ignited. Also included are solid biomass feedstock and raw products associated with agro-industrial facilities and the outdoor storage of pallets at pallet manufacturing and recycling facilities. This chapter requires active and passive fire protection features to reduce on- and off-site exposures, limit fire size and development and facilitate firefighting by employees and the fire service.

SECTION 2801—GENERAL

2801.1 Scope. The storage, manufacturing and processing of solid biomass feedstock, timber, lumber, plywood, veneers and agro-industrial byproducts shall be in accordance with this chapter.

2801.2 Permit. Permits shall be required as set forth in Section 105.5.

SECTION 2802—DEFINITIONS

2802.1 Definitions. The following terms are defined in Chapter 2:

AGRO-INDUSTRIAL.

BIOMASS.

COLD DECK.

FINES.

HOGGED MATERIALS.

PLYWOOD AND VENEER MILLS.

RAW PRODUCT.

SOLID BIOFUEL.

SOLID BIOMASS FEEDSTOCK.

STATIC PILES.

TIMBER AND LUMBER PRODUCTION FACILITIES.

SECTION 2803—GENERAL REQUIREMENTS

2803.1 Open yards. Open yards required by the *California Building Code* shall be maintained around structures.

2803.2 Dust control. Equipment or machinery located inside buildings that generates or emits combustible dust shall be provided with an approved dust collection and exhaust system installed in accordance with Chapter 22 and the *California Mechanical Code*. Equipment or systems that are used to collect, process or convey combustible dusts shall be provided with an approved explosion control system.

2803.2.1 Explosion venting. Where a dust explosion hazard exists in equipment rooms, buildings or other enclosures, such areas shall be provided with explosion (deflagration) venting or an approved explosion suppression system complying with Section 911.

2803.3 Waste removal. Sawmills, planning mills and other woodworking plants shall be equipped with a waste removal system that will collect and remove sawdust and shavings. Such systems shall be installed in accordance with Chapter 22 and the *California Mechanical Code*.

Exception: Manual waste removal where approved.

2803.3.1 Housekeeping. Provisions shall be made for a systematic and thorough cleaning of the entire plant at sufficient intervals to prevent the accumulations of combustible dust and spilled combustible or flammable liquids.

2803.3.2 Metal scrap. Provision shall be made for separately collecting and disposing of any metal scrap so that such scrap will not enter the wood handling or processing equipment.

2803.4 Electrical equipment. Electrical wiring and equipment shall comply with *the California Electrical Code.*

2803.5 Control of ignition sources. Protection from ignition sources shall be provided in accordance with Sections 2803.5.1 through 2803.5.3.

2803.5.1 Cutting and welding. Cutting and welding shall comply with Chapter 35.

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2803.5.2 Static electricity. Static electricity shall be prevented from accumulating on machines and equipment subject to static electricity buildup by permanent grounding and bonding wires or other approved means.

2803.5.3 Smoking. Where smoking constitutes a fire hazard, the fire code official is authorized to order the owner or occupant to post approved "No Smoking" signs complying with Section 310. The fire code official is authorized to designate specific locations where smoking is allowed.

2803.6 Fire apparatus access roads. Fire apparatus access roads shall be provided for buildings and facilities in accordance with Section 503.

2803.7 Access plan. Where storage pile configurations could change because of changes in product operations and processing, the access plan shall be submitted for approval where required by the fire code official.

SECTION 2804—FIRE PROTECTION

2804.1 General. Fire protection in timber and lumber production mills, plywood and veneer mills and agro-industrial facilities shall comply with Sections 2804.2 through 2804.4.

2804.2 Fire alarms. An approved means for transmitting alarms to the fire department shall be provided in timber and lumber production mills and plywood and veneer mills.

2804.2.1 Manual fire alarms. A manual fire alarm system complying with Section 907.2 shall be installed in areas of timber and lumber production mills and for plywood and veneer mills that contain product dryers.

Exception: Where dryers or other sources of ignition are protected by a supervised automatic sprinkler system complying with Section 903.

2804.3 Portable fire extinguishers or standpipes and hose. Portable fire extinguishers or standpipes and hose supplied from an approved water system shall be provided within a 50-foot (15 240 mm) distance of travel from any machine producing shavings or sawdust. Portable fire extinguishers shall be provided in accordance with Section 906 for extra-high hazards.

2804.4 Automatic sprinkler systems. Automatic sprinkler systems shall be installed in accordance with Section 903.3.1.1.

SECTION 2805—PLYWOOD, VENEER AND COMPOSITE BOARD MILLS

2805.1 General. Plant operations of plywood, veneer and composite board mills shall comply with Sections 2805.2 and 2805.3.

2805.2 Dryer protection. Dryers shall be protected throughout by an approved, automatic deluge water-spray suppression system complying with Chapter 9. Deluge heads shall be inspected quarterly for pitch buildup. Deluge heads shall be flushed during regular maintenance for functional operation. Manual activation valves shall be located within 75 feet (22 860 mm) of the drying equipment.

2805.3 Thermal oil-heating systems. Facilities that use heat transfer fluids to provide process equipment heat through piped, indirect heating systems shall comply with this code and NFPA 664.

SECTION 2806—LOG STORAGE AREAS

2806.1 General. Log storage areas shall comply with Sections 2806.2 and 2806.3.

2806.2 Cold decks. Cold decks shall not exceed 500 feet (152.4 m) in length, 300 feet (91 440 mm) in width and 20 feet (6096 mm) in height. Cold decks shall be separated from adjacent cold decks or other exposures by not less than 100 feet (30 480 mm).

Exception: The size of cold decks shall be determined by the fire code official where the decks are protected by special fire protection including, but not limited to, additional fire flow, portable turrets and deluge sets, and hydrant hose houses equipped with approved firefighting equipment capable of reaching the entire storage area in accordance with Chapter 9.

2806.3 Pile stability. Log and pole piles shall be stabilized by approved means.

SECTION 2807—STORAGE OF WOOD CHIPS AND HOGGED MATERIALS ASSOCIATED WITH TIMBER AND LUMBER PRODUCTION FACILITIES

2807.1 General. The storage of wood chips and hogged materials associated with timber and lumber production facilities shall comply with Sections 2807.2 through 2807.5.

2807.2 Size of piles. Piles shall not exceed 60 feet (18 288 mm) in height, 300 feet (91 440 mm) in width and 500 feet (152 m) in length. Piles shall be separated from adjacent piles or other exposures by approved fire apparatus access roads.

Exception: The fire code official is authorized to allow the pile size to be increased where additional fire protection is provided in accordance with Chapter 9. The increase shall be based on the capabilities of the system installed.

2807.3 Pile fire protection. Automatic sprinkler protection shall be provided in conveyor tunnels and combustible enclosures that pass under a pile. Combustible or enclosed conveyor systems shall be equipped with an approved automatic sprinkler system.

2807.4 Material-handling equipment. Approved material-handling equipment shall be readily available for moving wood chips and hogged material.

2807.5 Emergency plan. The owner or operator shall develop a plan for monitoring, controlling and extinguishing spot fires. The plan shall be submitted to the fire code official for review and approval.

SECTION 2808—STORAGE AND PROCESSING OF WOOD CHIPS, HOGGED MATERIALS, FINES, COMPOST, SOLID BIOMASS FEEDSTOCK AND RAW PRODUCT ASSOCIATED WITH YARD WASTE, AGRO-INDUSTRIAL AND RECYCLING FACILITIES

2808.1 General. The storage and processing of wood chips, hogged materials, fines, compost, solid biomass feedstock and raw product produced from yard waste, debris and agro-industrial and recycling facilities shall comply with Sections 2808.2 through 2808.10.

2808.2 Storage site. Storage sites shall be level and on solid ground, elevated soil lifts or other all-weather surface. Sites shall be thoroughly cleaned before transferring wood products to the site.

2808.3 Size of piles. Piles shall not exceed 25 feet (7620 mm) in height, 150 feet (45 720 mm) in width and 250 feet (76 200 mm) in length. Stackable products shall not be stacked in excess of 25 feet (7620 mm) in height, 80 feet (24 384 mm) in width and 250 feet (76 200 mm) in length.

2808.3.1 Increase in pile or stack size. Piles or stackable products are permitted to be increased beyond the dimensions in Section 2808.3 provided that a written fire protection plan is approved by the fire code official. The fire protection plan shall include, but not be limited to, the following:

1. Contact information for after-hours response by facility personnel.
2. Storage yard areas and material-handling equipment selection, pile design and arrangement shall be based on sound safety and fire protection principles.
3. Fire apparatus access roads around the piles or stacks and access roads to the top of piles, if applicable, shall be established, identified and maintained.
4. The potential for spontaneous heating shall be evaluated and provisions made to control the temperature of the piles. Methods for monitoring the internal temperature of the pile shall be provided.
5. Routine yard inspections shall be conducted by trained personnel.
6. A means for early fire detection and reporting to the public fire department shall be provided.
7. Facilities and equipment needed by the fire department for fire extinguishment shall be provided, including a water supply in compliance with Section 507 and heavy equipment necessary to move material.
8. A de-inventory plan shall be utilized to remove alternating piles or stacked products in a manner to increase the separation distances between the remaining piles or stacks.
9. The increased pile size shall be based on the capabilities of the installed fire protection systems and features.
10. A controlled burn area shall be provided on-site for smoldering or damaged product.

2808.4 Pile separation. Piles or stacked product shall be separated from buildings, property lines and adjacent piles or stacks by a distance of not less than one and one-half times the height of the pile or stack. The distance between rows shall be a minimum of 30 feet (9144 mm). Approved fire apparatus access roads shall be provided within the separation space in accordance with Section 503.

2808.5 Combustible waste. The storage, accumulation and handling of combustible materials and control of vegetation shall comply with Chapter 3.

2808.6 Static pile protection. Static piles shall be monitored by an approved means to measure temperatures within the static piles. Internal pile temperatures shall be monitored and recorded weekly. Such records shall be maintained. An operational plan indicating procedures and schedules for the inspection, monitoring and restricting of excessive internal temperatures in static piles shall be submitted to the fire code official for review and approval.

2808.7 Pile fire protection. Automatic sprinkler protection shall be provided in conveyor tunnels and combustible enclosures that pass under a pile. Combustible conveyor systems and enclosed conveyor systems shall be equipped with an approved automatic sprinkler system.

2808.8 Fire extinguishers. Portable fire extinguishers complying with Section 906 and with a minimum rating of 4-A:60-B:C shall be provided on all vehicles and equipment operating on piles and at all processing equipment.

2808.9 Material-handling equipment. Approved material-handling equipment shall be available for moving wood chips, hogged material, wood fines and raw product during firefighting operations.

2808.10 Emergency plan. The owner or operator shall develop a plan for monitoring, controlling and extinguishing spot fires and submit the plan to the fire code official for review and approval.

SECTION 2809—EXTERIOR STORAGE OF FINISHED LUMBER AND SOLID BIOFUEL PRODUCTS

2809.1 General. Exterior storage of finished lumber and solid biofuel products shall comply with Sections 2809.2 through 2809.5.

2809.2 Size of piles. Exterior storage shall be arranged to form stable piles with a maximum height of 20 feet (6096 mm). Piles shall not exceed 150,000 cubic feet (4248 m^3) in volume.

2809.3 Fire apparatus access roads. Fire apparatus access roads in accordance with Section 503 shall be located so that a maximum grid system unit of 50 feet by 150 feet (15 240 mm by 45 720 mm) is established.

2809.4 Security. Permanent storage areas shall be surrounded with an approved fence. Fences shall be not less than 6 feet (1829 mm) in height.

Exceptions:

1. Lumber piles inside of buildings and production mills for lumber, plywood and veneer.

2. Solid biofuel piles inside of buildings and agro-industrial processing facilities for solid biomass feedstock.

2809.5 Fire protection. An approved hydrant and hose system or portable fire-extinguishing equipment suitable for the fire hazard involved shall be provided for open storage yards. Hydrant and hose systems shall be installed in accordance with NFPA 24. Portable fire extinguishers complying with Section 906 shall be located so that the distance of travel from the nearest unit does not exceed 75 feet (22 860 mm).

SECTION 2810 —OUTDOOR STORAGE OF PALLETS AT PALLET MANUFACTURING AND RECYCLING FACILITIES

2810.1 General. The outside storage of wood pallets and wood composite pallets on the same site as a pallet manufacturing or pallet recycling facility shall comply with Sections 2810.2 through 2810.11.

2810.2 Site plan. Each site shall maintain a current site plan. The site plan shall be submitted to the fire code official for approval and contain all of the following:

1. Lot lines.
2. Utilities.
3. Size, location and type of construction of the buildings on the property.
4. Presence of the fire protection systems.
5. Water supply sources for firefighting purposes.
6. Location of hazardous material storage areas.
7. Location of pallet storage.
8. Equipment protected with a dust collection system.
9. Fire apparatus access roads.
10. Designated smoking areas.
11. Location of fire alarm control panels.

2810.3 Fire prevention plan. The owner or owner's authorized representative shall submit a fire prevention plan for review and approval by the fire code official that includes all of the following:

1. Frequency of walk-through inspections to verify compliance with the plan.
2. Hot work permit program in accordance with Chapter 35.
3. Preventative maintenance program for equipment associated with pallet activities.
4. Inspection, testing and maintenance of fire protection systems in accordance with Chapter 9.

2810.4 Fire safety and evacuation plan. The owner or owner's authorized representative shall prepare and train employees in an approved fire safety and evacuation plan in accordance with Chapter 4.

2810.5 Security management plan. The owner or owner's authorized representative shall prepare a security management plan based on a security risk assessment and shall make the plan and assessment available to the fire code official upon request.

2810.6 Clearance to property line. Stacks of pallets shall not be stored within 0.75 times the stack height or 8 feet (2438 mm) of the property line, whichever is greater, or shall comply with Section 2810.11.

2810.7 Clearance to important buildings. Stacks of pallets shall not be stored within 0.75 times the stack height of any important building on site, or shall comply with Section 2810.11.

2810.8 Height. Pallet stacks shall not exceed 20 feet (6096 mm) in height.

2810.9 Fire flow. Fire-flow requirements for the site shall be determined by the fire code official.

2810.10 Portable fire extinguishers. Portable fire extinguishers shall be selected, installed and maintained in accordance with Section 906.

2810.11 Alternative approach. Where approved by the fire code official, pallet stacks are permitted to be located closer to a property line or structure than as required by Sections 2810.6 and 2810.7 where additional fire protection is provided, including, but not limited to, the following:

1. The storage yard areas and materials-handling equipment selection, design, and arrangement are based on an approved risk assessment.
2. Automatic fire detection that transmits an alarm to a supervising station in accordance with NFPA 72.
3. Fire apparatus access roads around all storage areas.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 29 – MANUFACTURE OF ORGANIC COATINGS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
29
MANUFACTURE OF ORGANIC COATINGS

User notes:

About this chapter: Chapter 29 regulates materials and processes associated with the manufacture of paints as well as bituminous, asphaltic and other diverse compounds formulated to protect buildings, machines and objects from the effects of weather, corrosion and hostile environmental exposures. Paint for decorative, architectural and industrial uses comprises the bulk of organic coating production. Painting and processes related to the manufacture of nonflammable and noncombustible or water-based products are exempt from the provisions of this chapter. The application of organic coatings is covered by Chapter 24. Elimination of ignition sources, maintenance of fire protection equipment and isolation or segregation of hazardous operations are emphasized.

SECTION 2901—GENERAL

2901.1 Scope. Organic coating manufacturing processes shall comply with this chapter, except that this chapter shall not apply to processes manufacturing nonflammable or water-thinned coatings or to operations applying coating materials.

2901.2 Permits. Permits shall be required as set forth in Section 105.5.

2901.3 Maintenance. Structures and their service equipment shall be maintained in accordance with this code and NFPA 35.

SECTION 2902—DEFINITION

2902.1 Definition. The following term is defined in Chapter 2:

ORGANIC COATING.

SECTION 2903—GENERAL PRECAUTIONS

2903.1 Building features. Manufacturing of organic coatings shall be done only in buildings that do not have pits or basements.

2903.2 Location. Organic coating manufacturing operations and operations incidental to or connected with organic coating manufacturing shall not be located in buildings having other occupancies.

2903.3 Firefighting access. The fire department shall be able to access the organic coating manufacturing operations from not less than one side for the purpose of fire control. Approved aisles shall be maintained for the unobstructed movement of personnel and fire suppression equipment.

2903.4 Fire protection systems. Fire protection systems shall be installed, maintained, periodically inspected and tested in accordance with Chapter 9.

2903.5 Portable fire extinguishers. Not less than one portable fire extinguisher complying with Section 906 for extra hazard shall be provided in organic coating areas.

2903.6 Open flames. Open flames and direct-fired heating devices shall be prohibited in areas where flammable vapor-air mixtures exist.

2903.7 Smoking. Smoking shall be prohibited in accordance with Section 310.

2903.8 Power equipment. Power-operated equipment and industrial trucks shall be of a type approved for the location.

2903.9 Tank maintenance. The cleaning of tanks and vessels that have contained flammable or combustible liquids shall be performed under the supervision of persons knowledgeable of the fire and explosion potential.

2903.9.1 Repairs. Where necessary to make repairs involving hot work, the work shall be authorized by the responsible individual before the work begins.

2903.9.2 Empty containers. Empty flammable or combustible liquid containers shall be removed to a detached, outside location and, if not cleaned on the premises, the empty containers shall be removed from the plant as soon as practical.

2903.10 Drainage. Drainage facilities shall be provided to direct flammable and combustible liquid leakage and fire protection water to an approved location away from the building, any other structure, storage area or adjoining premises.

2903.11 Alarm system. An approved fire alarm system shall be provided in accordance with Section 907.

SECTION 2904—ELECTRICAL EQUIPMENT AND PROTECTION

2904.1 Wiring and equipment. Electrical wiring and equipment shall comply with this chapter and shall be installed in accordance with *the California Electrical Code.*

2904.2 Hazardous locations. Where Class I liquids are exposed to the air, the design of equipment and ventilation of structures shall be such as to limit the Class I, Division 1, locations to the following:

1. Piping trenches.
2. The interior of equipment.

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3. The immediate vicinity of pumps or equipment locations, such as dispensing stations, open centrifuges, plate and frame filters, opened vacuum filters, change cans and the surfaces of open equipment. The immediate vicinity shall include a zone extending from the vapor liberation point 5 feet (1524 mm) horizontally in all directions and vertically from the floor to a level 3 feet (914 mm) above the highest point of vapor liberation.

2904.2.1 Other locations. Locations within the confines of the manufacturing room where Class I liquids are handled shall be Class I, Division 2, except locations indicated in Section 2904.2.

2904.2.2 Ordinary equipment. Ordinary electrical equipment, including switchgear, shall be prohibited, except where installed in a room maintained under positive pressure with respect to the hazardous area. The air or other media utilized for pressurization shall be obtained from a source that will not cause any amount or type of flammable vapor to be introduced into the room.

2904.3 Bonding. Equipment including, but not limited to, tanks, machinery and piping shall be bonded and connected to a ground where an ignitable mixture is capable of being present.

2904.3.1 Piping. Electrically isolated sections of metallic piping or equipment shall be grounded or bonded to the other grounded portions of the system.

2904.3.2 Vehicles. Tank vehicles loaded or unloaded through open connections shall be grounded and bonded to the receiving system.

2904.3.3 Containers. Where a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers, and one shall be grounded.

2904.4 Ground. Metal framing of buildings shall be grounded with resistance of not more than 5 ohms.

SECTION 2905—PROCESS STRUCTURES

2905.1 Design. Process structures shall be designed and constructed in accordance with the *California Building Code*.

2905.2 Fire apparatus access. Fire apparatus access complying with Section 503 shall be provided for the purpose of fire control to not less than one side of organic coating manufacturing operations.

2905.3 Drainage. Drainage facilities shall be provided in accordance with Section 2903.10 where topographical conditions are such that flammable and combustible liquids are capable of flowing from the organic coating manufacturing operation so as to constitute a fire hazard to other premises.

2905.4 Explosion control. Explosion control shall be provided in areas subject to potential deflagration hazards as indicated in NFPA 35. Explosion control shall be provided in accordance with Section 911.

2905.5 Ventilation. Enclosed structures in which Class I liquids are processed or handled shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of solid floor area. Ventilation shall be accomplished by exhaust fans that take suction at floor levels and discharge to a safe location outside the structure. Noncontaminated intake air shall be introduced in such a manner that all portions of solid floor areas are provided with continuous uniformly distributed air movement.

2905.6 Heating. Heating provided in hazardous areas shall be by indirect means. Ignition sources such as open flames or electrical heating elements, except as provided for in Section 2904, shall not be permitted within the structure.

SECTION 2906—PROCESS MILLS AND KETTLES

2906.1 Mills. Mills, operating with close clearances, which process flammable and heat-sensitive materials, such as nitrocellulose, shall be located in a detached building or in a noncombustible structure without other occupancies. The amount of nitrocellulose or other flammable material brought into the area shall not be more than the amount required for a batch.

2906.2 Mixers. Mixers shall be of the enclosed type or, where of the open type, shall be provided with properly fitted covers. Where flow is by gravity, a shutoff valve shall be installed as close as practical to the mixer, and a control valve shall be provided near the end of the fill pipe.

2906.3 Open kettles. Open kettles shall be located in an outside area provided with a protective roof; in a separate structure of noncombustible construction; or separated from other areas by a noncombustible wall having a fire-resistance rating of not less than 2 hours.

2906.4 Closed kettles. Contact-heated kettles containing solvents shall be equipped with safety devices that, in case of a fire, will turn off the process heat, turn on the cooling medium and inject inert gas into the kettle.

2906.4.1 Vaporizer location. The vaporizer section of heat-transfer systems that heat closed kettles containing solvents shall be remotely located.

2906.5 Kettle controls. The kettle and thin-down tank shall be instrumented, controlled and interlocked so that any failure of the controls will result in a safe condition. The kettle shall be provided with a pressure-rupture disc in addition to the primary vent. The vent piping from the rupture disc shall be of minimum length and shall discharge to an approved location. The thin-down tank shall be adequately vented. Thinning operations shall be provided with an adequate vapor removal system.

SECTION 2907—PROCESS PIPING

2907.1 Design. Piping, valves and fittings shall be designed for the working pressures and structural stresses to which the piping, valves and fittings will be subjected, and shall be of steel or other material approved for the service intended.

2907.2 Valves. Valves shall be of an indicating type. Terminal valves on remote pumping systems shall be of the dead-man type, shutting off both the pump and the flow of solvent.

2907.3 Support. Piping systems shall be supported adequately and protected against physical damage. Piping shall be pitched to avoid unintentional trapping of liquids, or approved drains shall be provided.

2907.4 Connectors. Approved flexible connectors shall be installed where vibration exists or frequent movement is necessary. Hose at dispensing stations shall be of an approved type.

2907.5 Tests. Before being placed in service, all piping shall be free of leaks when tested for not less than 30 minutes at not less than 1.5 times the working pressure or not less than 5 pounds per square inch gauge (psig) (35 kPa) at the highest point in the system.

SECTION 2908—RAW MATERIALS IN PROCESS AREAS

2908.1 Nitrocellulose quantity. The amount of nitrocellulose brought into the operating area shall not exceed the amount required for a work shift. Nitrocellulose spillage shall be promptly swept up and disposed of properly.

2908.2 Organic peroxides quantity. Organic peroxides brought into the operating area shall be in the original shipping container. When in the operating area, the organic peroxide shall not be placed in locations exposed to ignition sources, heat or mechanical shocks.

SECTION 2909—RAW MATERIALS AND FINISHED PRODUCTS

2909.1 General. The storage, handling and use of flammable and combustible liquids in process areas shall be in accordance with Chapter 57.

2909.2 Tank storage. Tank storage for flammable and combustible liquids located inside of structures shall be limited to storage areas at or above grade that are separated from the processing area in accordance with the *California Building Code*. Processing equipment containing flammable and combustible liquids and storage in quantities essential to the continuity of the operations shall not be prohibited in the processing area.

2909.3 Tank vehicle. Tank car and tank vehicle loading and unloading stations for Class I liquids shall be separated from the processing area, other plant structures, nearest lot line of property that can be built on or public thoroughfare by a minimum clear distance of 25 feet (7620 mm).

2909.3.1 Loading. Loading and unloading structures and platforms for flammable and combustible liquids shall be designed and installed in accordance with Chapter 57.

2909.3.2 Safety. Tank cars for flammable liquids shall be unloaded such that the safety to persons and property is ensured. Tank vehicles for flammable and combustible liquids shall be loaded and unloaded in accordance with Chapter 57.

2909.4 Nitrocellulose storage. Nitrocellulose storage shall be located on a detached pad or in a separate structure or a room enclosed in accordance with the *California Building Code*. The nitrocellulose storage area shall not be utilized for any other purpose. Electrical wiring and equipment installed in storage areas adjacent to process areas shall comply with Section 2904.2.

2909.4.1 Containers. Nitrocellulose shall be stored in closed containers. Barrels shall be stored on end and not more than two tiers high. Barrels or other containers of nitrocellulose shall not be opened in the main storage structure but at the point of use or other location intended for that purpose.

2909.4.2 Spills. Spilled nitrocellulose shall be promptly wetted with water and disposed of by use or burning in the open at an approved detached location.

2909.5 Organic peroxide storage. The storage of organic peroxides shall be in accordance with Chapter 62.

2909.5.1 Size. The size of the package containing organic peroxide shall be selected so that, as nearly as practical, full packages are utilized at one time. Spilled peroxide shall be promptly cleaned up and disposed of as specified by the supplier.

2909.6 Finished products. Finished products that are flammable or combustible liquids shall be stored outside of structures, in a separate structure, or in a room separated from the processing area in accordance with the *California Building Code*. The storage of finished products shall be in tanks or closed containers in accordance with Chapter 57.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 30 – INDUSTRIAL OVENS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

30 INDUSTRIAL OVENS

User notes:

About this chapter: Chapter 30 addresses the fuel supply, ventilation, emergency shutdown equipment, fire protection and the operation and maintenance of industrial ovens, which are sometimes referred to as industrial heat enclosures or industrial furnaces. Compliance with this chapter is intended to reduce the likelihood of fires involving industrial ovens, which are usually the result of the fuel in use or volatile vapors given off by the materials being heated, or to manage the impact if a fire should occur.

SECTION 3001—GENERAL

3001.1 Scope. This chapter shall apply to the installation and operation of industrial ovens and furnaces. Industrial ovens and furnaces shall comply with the applicable provisions of the *International Fuel Gas Code*, the *California Mechanical Code*, NFPA 86, and this chapter. The terms "ovens" and "furnaces" are used interchangeably in this chapter.

3001.2 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

SECTION 3002—DEFINITIONS

3002.1 Definitions. The following terms are defined in Chapter 2:

FURNACE CLASS A.

FURNACE CLASS B.

FURNACE CLASS C.

FURNACE CLASS D.

SECTION 3003—LOCATION

3003.1 Ventilation. Enclosed rooms or *basements* containing industrial ovens or furnaces shall be provided with combustion air in accordance with the *International Fuel Gas Code* and the *California Mechanical Code*, and with ventilation air in accordance with the *California Mechanical Code*.

3003.2 Exposure. When locating ovens, oven heaters and related equipment, the possibility of fire resulting from overheating or from the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion shall be considered.

3003.3 Ignition source. Industrial ovens and furnaces shall be located so as not to pose an ignition hazard to flammable vapors or mists or combustible dusts.

3003.4 Temperatures. Roofs and floors of ovens shall be insulated and ventilated to prevent temperatures at combustible ceilings and floors from exceeding 160°F (71°C).

SECTION 3004—FUEL PIPING

3004.1 Fuel-gas piping. Fuel-gas piping serving industrial ovens shall comply with the *International Fuel Gas Code*. Piping for other fuel sources shall comply with this section.

3004.2 Shutoff valves. Each industrial oven or furnace shall be provided with an approved manual fuel shutoff valve in accordance with the *International Fuel Gas Code* or the *California Mechanical Code*.

3004.2.1 Fuel supply lines. Valves for fuel supply lines shall be located within 6 feet (1829 mm) of the appliance served.

Exception: Where approved and the valve is located in the same general area as the appliance served.

3004.3 Valve position. The design of manual fuel shutoff valves shall incorporate a permanent feature that visually indicates the open or closed position of the valve. Manual fuel shutoff valves shall not be equipped with removable handles or wrenches unless the handle or wrench can only be installed parallel with the fuel line when the valve is in the open position.

SECTION 3005—INTERLOCKS

3005.1 Shut down. Interlocks shall be provided for Class A ovens so that conveyors or sources of flammable or combustible materials shall shut down if either the exhaust or recirculation air supply fails.

SECTION 3006—FIRE PROTECTION

3006.1 Required protection. Class A and B ovens that contain, or are utilized for the processing of, combustible materials shall be protected by an approved automatic fire-extinguishing system complying with Chapter 9.

Exceptions:

1. Small tabletop ovens used in laboratory facilities.
2. Nonwalk-in ovens that are less than 4 feet (1219 mm) in length and width.

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3006.2 Fixed fire-extinguishing systems. Fixed fire-extinguishing systems shall be provided for Class C or D ovens to protect against such hazards as overheating, spillage of molten salts or metals, quench tanks, ignition of hydraulic oil and escape of fuel. It shall be the user's responsibility to consult with the fire code official concerning the necessary requirements for such protection.

3006.3 Fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided not closer than 15 feet (4572 mm) or not more than 50 feet (15 240 mm) or in accordance with NFPA 10. This shall apply to the oven and related equipment.

SECTION 3007—OPERATION AND MAINTENANCE

3007.1 Furnace system information. An approved, clearly worded, and prominently displayed safety design data form or manufacturer's nameplate shall be provided stating the safe operating condition for which the furnace system was designed, built, altered or extended.

3007.2 Oven nameplate. Safety data for Class A solvent atmosphere ovens shall be furnished on the manufacturer's nameplate. The nameplate shall provide the following design data:

1. The solvent used.
2. The number of gallons (L) used per batch or per hour of solvent entering the oven.
3. The required purge time.
4. The oven operating temperature.
5. The exhaust blower rating for the number of gallons (L) of solvent per hour or batch at the maximum operating temperature.

   Exception: For low-oxygen ovens, the maximum allowable oxygen concentration shall be included in place of the exhaust blower ratings.

3007.3 Training. Operating, maintenance and supervisory personnel shall be thoroughly instructed and trained in the operation of ovens or furnaces.

3007.4 Equipment maintenance. Equipment shall be maintained in accordance with the manufacturer's instructions.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 31 – TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
3101.1			X																				
[T-19 §303 (a)(b)]				X																			
3101.2			X																				
3101.3			X																				
3103.7.2			X																				
3103.8.1.1			X																				
[T-19 §340]				X																			
[T-19 §341]				X																			
[T-19 §321]				X																			
[T-19 §315 (a)]				X																			
[T-19 §332 (a)]				X																			
3104.2				X																			
[T-19 §334]				X																			
[T-19 §335 (a)(b)]				X																			
[T-19 §315 (d)]				X																			
3106.3			X																				
[T-19 §316]				X																			
[T-19 §315 (b)]				X																			
[T-19 §326 (b)]				X																			
[T-19 §316]				X																			
[T-19 §317]				X																			
3108.9			X																				
[T-19 §319 (a-c]				X																			
[T-19 §319 (d)(e)]				X																			
[T-19 §324 (a)(b)]				X																			
[T-19 §320]				X																			
[T-19 §326 (a)]				X																			
[T-19 §326 (c)]				X																			
3108.19			X																				

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CHAPTER

31

TENTS, TEMPORARY SPECIAL EVENT STRUCTURES AND OTHER MEMBRANE STRUCTURES

User notes:

About this chapter: Chapter 31 provides requirements that are intended to protect temporary as well as permanent tents and air-supported and other membrane structures and temporary stage special event structures from fire and similar hazards. The provisions regulate structure location and access, anchorage, egress, heat-producing equipment, hazardous materials and operations, combustible vegetation, ignition sources, and waste accumulation. This is accomplished through requiring regular inspections and certifying continued compliance with fire safety regulations. This chapter also addresses outdoor assembly events, which are not limited to those events with tents or other membrane structures, but are regulated due to the number of people, density of those people and hazards associated with large outdoor events related to egress, fire hazards from cooking and other related concerns.

SECTION 3101—GENERAL

3101.1 Scope. Tents, temporary special event structures and membrane structures shall comply with this chapter. The provisions of Section 3103 are applicable only to temporary tents and membrane structures. The provisions of Sections 3104 and 3108 are applicable to temporary and permanent tents and membrane structures. The provisions of Section 3105 are applicable to temporary special event structures. *The provisions of Section 3106 are applicable to inflatable amusement devices.* The provisions of Section 3106 are applicable to inflatable amusement devices. The provisions of Section 3107 are applicable to outdoor assembly events. Other temporary structures shall comply with the *California Building Code*.

These building standards govern the use of tents, awnings or other fabric enclosures, including membrane (air-supported and air-inflated) structures and places of assemblage, in or under which 10 or more persons may gather for any lawful purpose.

Exceptions:

1. *Tents, awnings or other fabric enclosures used to cover or enclose private swimming pools and similar facilities on the premises of private one- and two-family dwellings.*
2. *Tents used to conduct committal services on the ground of a cemetery.*
3. *Tents, awnings or other fabric enclosures erected and used within a sound stage, or other similar structural enclosure which is equipped with an overhead automatic sprinkler system.*
4. *Tensioned membrane roof materials supported by rigid frames or installed on a mast and cable system provided such structures conform to the requirements of one of the types of construction as described in these regulations.*
5. *Fabric structures which are part of mobile homes, recreational vehicles or commercial coaches governed by the provisions of Division 13, Part 2, Health and Safety Code (Department of Housing and Community Development).*

[California Code of Regulations, Title 19, Division 1, §303.(a) and (b)] Scope.

(a) The provisions of California Code of Regulations, Title 19, Division 1, Chapter 2 apply to the sale, offering for sale, manufacture for sale, rental and use of tents within this state.

(b) For building standards relating to tents and membrane structures, see California Code of Regulations, Title 24, Part 9.

3101.2 Alternate means of protection. *When approved by the enforcing agency, exceptions to the provisions of these building standards may be permitted, provided alternate means of protection which are at least equal to these regulations in quality, strength, effectiveness, fire resistance, durability and safety are provided.*

3101.3 Labor camps. *Tents used in labor camps for the housing of employees shall have tight wooden floors raised at least 4 inches (102 mm) above ground level having baseboards on all sides to a height of at least 6 inches (152 mm) or shall have concrete slabs with finished surface at least 4 inches (102 mm) above grade having baseboards on all sides to a height of at least 6 inches (152 mm).*

Electrical installations serving and installed within tents shall comply with the applicable requirements of the California Electrical Code.

Tents shall not be considered suitable sleeping places when it is found necessary to provide heating facilities in order to maintain a minimum temperature of 60°F (33.3°C) within such tent during the period of occupancy.

Note: *See Section 17008 of the Health and Safety Code for definition of labor camp.*

SECTION 3102—DEFINITIONS

3102.1 Definitions. The following terms are defined in Chapter 2:

AIR-INFLATED STRUCTURE.

AIR-SUPPORTED STRUCTURE.

MEMBRANE STRUCTURE.

TEMPORARY SPECIAL EVENT STRUCTURE.

TENT.

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SECTION 3103—TEMPORARY TENTS AND MEMBRANE STRUCTURES

3103.1 General. Tents and membrane structures used for temporary periods shall comply with this section and Section 3107. Other temporary structures erected for a period of 180 days or less shall comply with the *California Building Code*.

3103.2 Approval required. Tents and membrane structures required to have a permit, as set forth in Sections 105.5 and 105.6, shall not be erected, operated or maintained for any purpose without first obtaining a permit and approval from the fire code official.

3103.3 Outdoor assembly event. For the purposes of this chapter, an outdoor assembly event shall include a circus, carnival, tent show, theater, skating rink, dance hall or other place of assembly in or under which persons gather for any purpose.

3103.3.1 Special amusement area. Tents and other membrane structures erected as a special amusement area shall be equipped with an automatic sprinkler system in accordance with Section 914.7.1.

3103.4 Use period. Temporary tents, air-supported, air-inflated or tensioned membrane structures shall not be erected for a period of more than 180 days within a 12-month period on a single premises.

3103.5 Construction documents. A detailed site and floor plan for tents or membrane structures with an occupant load of 50 or more shall be provided with each application for approval. The tent or membrane structure floor plan shall indicate details of the means of egress facilities, seating capacity, arrangement of the seating and location and type of heating and electrical equipment. The construction documents shall include an analysis of structural stability. Water-filled vessels used to anchor a tent or membrane structure shall be in accordance with Section 3103.8.1.

3103.6 Inspections. The entire tent, air-supported, air-inflated or tensioned membrane structure system shall be inspected at regular intervals, but not less than two times per permit use period, by the permittee, owner or agent to determine that the installation is maintained in accordance with this chapter.

Exception: Permit use periods of less than 30 days.

3103.6.1 Inspection report. Where required by the fire code official, an inspection report shall be provided and shall consist of maintenance, anchors and fabric inspections.

3103.7 Access, location and parking. Access, location and parking for temporary tents and membrane structures shall be in accordance with this section.

3103.7.1 Access. Fire apparatus access roads shall be provided in accordance with Section 503.

3103.7.2 Location. *T*ents or membrane structures shall not be located within 20 feet (6096 mm) of lot lines, buildings, other tents or membrane structures, parked vehicles or internal combustion engines. For the purpose of determining required distances, support ropes and guy wires shall be considered as part of the temporary membrane structure or tent.

Exceptions:

1. Separation distance between membrane structures and tents not used for cooking is not required where the aggregate floor area does not exceed 15,000 square feet (1394 m^2).
2. Membrane structures or tents need not be separated from buildings where all of the following conditions are met:
   - 2.1. The aggregate floor area of the membrane structure or tent shall not exceed 10,000 square feet (929 m^2).
   - 2.2. The aggregate floor area of the building and membrane structure or tent shall not exceed the allowable floor area including increases as indicated in the *California Building Code*.
   - 2.3. Required means of egress are provided for both the building and the membrane structure or tent, including travel distances.
   - 2.4. Fire apparatus access roads are provided in accordance with Section 503.
3. *When approved by the enforcing agency, tents may be located in or on permanent buildings provided such use does not constitute an undue hazard.*

3103.7.3 Location of structures in excess of 15,000 square feet in area. Membrane structures having an area of 15,000 square feet (1394 m^2) or more shall be located not less than 50 feet (15 240 mm) from any other tent or structure as measured from the sidewall of the tent or membrane structure unless joined together by a corridor.

3103.7.4 Membrane structures on buildings. Membrane structures that are erected on buildings, balconies, decks or other structures shall be regulated as permanent membrane structures in accordance with Section 3102 of the *California Building Code*.

3103.7.5 Connecting corridors. Tents or membrane structures are allowed to be joined together by means of corridors. Exit doors shall be provided at each end of such corridor. On each side of such corridor and approximately opposite each other, there shall be provided openings not less than 12 feet (3658 mm) wide.

3103.7.6 Fire break. An unobstructed fire break passageway or fire road not less than 12 feet (3658 mm) wide and free from guy ropes or other obstructions shall be maintained on all sides of all tents and membrane structures unless otherwise approved by the fire code official.

3103.8 Structural stability and anchorage required. Tents or membrane structures and their appurtenances shall be designed and installed to withstand the elements of weather and prevent collapsing. Documentation of structural stability shall be furnished to the fire code official.

3103.8.1 Water-filled vessels. Water-filled vessels shall be permitted to be used where approved and in accordance with the tent or membrane structure manufacturer's load specifications.

3103.8.1.1 Water-filled vessels. *Water-filled vessels shall not be used to anchor a tent or membrane structure unless approved and in accordance with the tent or membrane structure manufacturer's instructions.*

3103.8.2 Tents and membrane structures greater than one story. Tents and membrane structures exceeding one story shall be designed and constructed to comply with Sections 1606 through 1609 of the *California Building Code*.

3103.8.3 Tents and membrane structures greater than 7,500 square feet. Tents and membrane structures greater than 7,500 square feet (697 m^2) shall be designed and constructed to comply with Sections 1606 through 1609 of the *California Building Code*.

3103.8.4 Tents and membrane structures with an occupant load greater than 1,000. Tents and membrane structures with an occupant capacity greater than 1,000 persons shall be designed and constructed to comply with Sections 1606 through 1609 of the *California Building Code*.

3103.9 Temporary air-supported and air-inflated membrane structures. Temporary air-supported and air-inflated membrane structures shall be in accordance with Sections 3103.9.1 through 3103.9.4.

3103.9.1 Door operation. During high winds exceeding 50 miles per hour (22 m/s) or in snow conditions, the use of doors in air-supported structures shall be controlled to avoid excessive air loss. Doors shall not be left open.

3103.9.2 Fabric envelope design and construction. Air-supported and air-inflated structures shall have the design and construction of the fabric envelope and the method of anchoring in accordance with ASI-77.

3103.9.3 Blowers. An air-supported structure used as a place of assembly shall be furnished with not less than two blowers, each of which has adequate capacity to maintain full inflation pressure with normal leakage. The design of the blower shall be so as to provide integral limiting pressure at the design pressure specified by the manufacturer.

3103.9.4 Auxiliary inflation systems. Places of public assembly for more than 200 persons shall be furnished with an auxiliary inflation system capable of powering a blower with the capacity to maintain full inflation pressure with normal leakage in accordance with Section 3103.9.3 for a minimum duration of 4 hours. The auxiliary inflation system shall be either a fully automatic auxiliary engine-generator set or a supplementary blower powered by an internal combustion engine that shall be automatic in operation. The system shall be capable of automatically operating the required blowers at full power within 60 seconds of a commercial power failure.

3103.10 Seating arrangements. Seating in tents or membrane structures shall be in accordance with Chapter 10.

3103.11 Means of egress. Means of egress for temporary tents and membrane structures shall be in accordance with Sections 3103.11.1 through 3103.11.8.

3103.11.1 Distribution. Exits shall be spaced at approximately equal intervals around the perimeter of the tent or membrane structure, and shall be located such that all points are 100 feet (30 480 mm) or less from an exit.

3103.11.2 Number. Tents or membrane structures or a usable portion thereof shall have not less than one exit and not less than the number of exits required by Table 3103.11.2. The total width of means of egress in inches (mm) shall be not less than the total occupant load served by a means of egress multiplied by 0.2 inches (5 mm) per person.

TABLE 3103.11.2—MINIMUM NUMBER OF MEANS OF EGRESS AND MEANS OF EGRESS WIDTHS FROM TEMPORARY MEMBRANE STRUCTURES AND TENTS

OCCUPANT LOAD	MINIMUM NUMBER OF MEANS OF EGRESS	MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)	MINIMUM WIDTH OF EACH MEANS OF EGRESS (inches)
		Tent	Membrane Structure
10 to 199	2	72	36
200 to 499	3	72	72
500 to 999	4	96	72
1,000 to 1,999	5	120	96
2,000 to 2,999	6	120	96
Over 3,000[a]	7	120	96

For SI: 1 inch = 25.4 mm.

a. When the occupant load exceeds 3,000, the total width of means of egress (in inches) shall be not less than the total occupant load multiplied by 0.2 inch per person.

3103.11.3 Exit openings from tents. Exit openings from tents shall remain open unless covered by a flame-resistant curtain. The curtain shall comply with the following requirements:

1. Curtains shall be free sliding on a metal support. The support shall be not less than 80 inches (2032 mm) above the floor level at the exit. The curtains shall be so arranged that, when open, no part of the curtains obstructs the exit.
2. Curtains shall be of a color, or colors, that contrasts with the color of the tent.

3103.11.4 Doors. Exit doors shall swing in the direction of exit travel. To avoid hazardous air and pressure loss in air-supported membrane structures, such doors shall be automatic closing against operating pressures. Opening force at the door edge shall not exceed 15 pounds (66 N).

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3103.11.5 Aisle. The width of aisles without fixed seating shall be in accordance with the following:

1. In areas serving employees only, the minimum aisle width shall be 24 inches (610 mm) but not less than the width required by the number of employees served.
2. In public areas, smooth-surfaced, unobstructed aisles having a minimum width of not less than 44 inches (1118 mm) shall be provided from seating areas, and aisles shall be progressively increased in width to provide, at all points, not less than 1 foot (305 mm) of aisle width for each 50 persons served by such aisle at that point.

3103.11.5.1 Arrangement and maintenance. The arrangement of aisles shall be subject to approval by the fire code official and shall be maintained clear at all times during occupancy.

3103.11.6 Exit signs. Exits shall be clearly marked. Exit signs shall be installed at required exit doorways and where otherwise necessary to indicate clearly the direction of egress where the exit serves an occupant load of 50 or more.

3103.11.6.1 Exit sign illumination. Exit signs shall be either listed and labeled in accordance with UL 924 as the internally illuminated type and used in accordance with the listing or shall be externally illuminated by luminaires supplied in either of the following manners:

1. Two separate circuits, one of which shall be separate from all other circuits, for occupant loads of 300 or less.
2. Two separate sources of power, one of which shall be an approved emergency system, shall be provided where the occupant load exceeds 300. Emergency systems shall be supplied from storage batteries or from the on-site generator set, and the system shall be installed in accordance with *the California Electrical Code*. The emergency system provided shall have a minimum duration of 90 minutes when operated at full design demand.

3103.11.7 Means of egress illumination. Means of egress shall be illuminated with light having an intensity of not less than 1 foot-candle (11 lux) at floor level while the structure is occupied. Fixtures required for means of egress illumination shall be supplied from a separate circuit or source of power.

3103.11.8 Maintenance of means of egress. The required width of exits, aisles and passageways shall be maintained at all times to a public way. Guy wires, guy ropes and other support members shall not cross a means of egress at a height of less than 8 feet (2438 mm). The surface of means of egress shall be maintained in an approved manner.

SECTION 3104—TEMPORARY AND PERMANENT TENTS AND MEMBRANE STRUCTURES

3104.1 General. Tents and membrane structures, both temporary and permanent, shall be in accordance with this section and Sections 3107 and 3108. Permanent tents and membrane structures shall also comply with the *California Building Code*.

[California Code of Regulations, Title 19, Division 1, §340] Existing Small Tents.

Existing small tents are exempt from California Code of Regulations, Title 19, Division 1, Chapter 2.

[California Code of Regulations, Title 19, Division 1, §341] Existing Membrane Structures and Other (Large) Existing Tents.

Existing membranes of membrane structures and large (10 or more capacity) existing tents may continue to be used provided evidence of satisfactory flame resistance is available to the enforcing authority. Such evidence may be in the form of certification that the fabric passes the standard small scale flame resistance test as set forth in California Code of Regulations, Title 19, Division 1, Chapter 8 regulations or through passage of effective field tests.

[California Code of Regulations, Title 19, Division 1, §321] Abatement of Fire or Panic Hazards.

Any condition that presents a fire hazard, would contribute to the rapid spread of fire, interfere with the rapid exit of persons from the tents, or interfere with or delay the extinguishment of a fire, shall be immediately corrected as ordered by the enforcing authority.

[California Code of Regulations, Title 19, Division 1, §315.(a)] Flame Resistance Standards.

(a) All tent fabrics and all interior decorative fabrics or materials shall be flame resistant in accordance with appropriate standards set forth in California Code of Regulations, Title 19, Division 1, Chapter 8.

Tent tops and sidewalls shall be made either from fabric which has been flame resistant treated with an approved exterior chemical process by an approved application concern, or from inherently flame-resistant fabric approved and listed by the State Fire Marshal.

[California Code of Regulations, Title 19, Division 1, §332.(a)] Flame Resistance.

(a) All tents manufactured for sale, sold, rented, offered for sale or used in California shall be made from nonflammable material or one of the following flame-resistant fabrics or material approved by the State Fire Marshal:

(1) Fabrics complying with the State Fire Marshal's requirements for flame resistance for exterior use, as set forth in California Code of Regulations, Title 19, Division 1, Chapter 8, or

(2) Fabrics complying with the flame-resistance requirements set forth in "A Specification for Flame- Resistance Materials Used in Camping Tentage" published in 1975 by Canvas Products Association International, hereinafter referred to as CPAI-84.

Exceptions:

(1) Tents used for committal services at cemeteries.

(2) Tents or similar fabric enclosures used within a sound stage or equivalent enclosure equipped with an overhead automatic fire extinguishing system.

3104.2 Flame propagation performance testing and *registration*. Before a permit is granted, the owner or agent shall file with the fire code official a *registration* provided by the product manufacturer to verify that the materials have been tested by a *California State Fire Marshal* approved testing laboratory. The *laboratory testing* shall indicate that the floor coverings, tents, membrane structures and their appurtenances, which include sidewalls, drops and tarpaulins, are composed of materials meeting the flame propagation performance

of *Title 19, California Code of Regulations, Chapter 8, Section 1237.1.* Additionally, it shall indicate that the bunting and combustible decorative materials and effects are composed of material meeting the flame propagation performance criteria of *Title 19, California Code of Regulations, Chapter 8, Section 1237.1*, as applicable. Alternatively, the materials shall be treated with a flame retardant in an approved manner and meet the flame propagation performance criteria of the applicable test method of *Title 19, California Code of Regulations, Chapter 8.* The certificate shall indicate compliance with the testing requirements of *Title 19, California Code of Regulations, Chapter 8.* The flame propagation performance criteria shall be effective for the period specified by the *registration*.

For California, all fabrics and all interior decorative fabrics or materials shall be flame resistant in accordance with the provisions set forth in CCR, Title 19, Division 1, and Chapter 8, and shall meet the requirements of this section. Tops and sidewalls shall be made either from fabric that has been flame-resistant treated with an approved exterior chemical process by an approved application concern, or from inherently flame-resistant fabric approved and listed by the State Fire Marshal (see CCR, Title 19, Division 1, Chapter 8).

3104.3 Label. Membrane structures or tents shall have a permanently affixed label bearing the following information:

1. The identification of size and fabric or material.
2. The names and addresses of the manufacturers of the tent or air-supported structure.
3. A statement that the fabric or material meets the requirements of Section 3104.2.
4. If treated, the date when a flame-retardant treatment was last applied to the fabric or material, the trade name or kind of chemical used in treatment, name of person or firm treating the fabric or material, and name of testing agency and test standard by which the fabric or material was tested.
5. If untreated, a statement that no treatment was applied when the fabric or material met the requirements of Section 3104.2.

[California Code of Regulations, Title 19, Division 1, §334.] Requirements Pertaining to All Tents.

All tents manufactured for sale in California shall be labeled in accordance with the appropriate provisions of California Code of Regulations, Title 19, Division 1, Section 335.

[California Code of Regulations, Title 19, Division 1, §335.(a) and (b)] Labeling of Tents.

(a) Each section of top and sidewall in large tents shall have a durable label, permanently affixed, bearing the following information:

(1) The Seal of Registration.

(2) If treated fabric, the name and registration number of the approved application concern and approved chemical used, and the date of treatment.

(3) If registered fabric, the trade name and registration number of the approved fabric, and the date of production.

In lieu of attached labels, the required information may be applied directly to the fabric by print, stamp or stencil.

(b) Small tents shall have a permanently affixed label bearing the information in California Code of Regulations, Title 19, Division 1, Section 335, subsection (a), or shall comply with the provisions specified in CPAI-84 (1975) which reads as follows:

(1) Certification. A statement that the materials used in the manufacture of the item meet the flame resistance requirements of CPAI-84.

(2) Manufacturer Identification. An identification of the manufacturer of the item. If the item bears a private label, it shall identify the private labeler and shall also contain a code mark which will permit the seller of the item to identify the manufacturer to the purchaser upon request.

(3) Code Number. A number enabling the manufacturer to identify from his records the suppliers and suppliers' lot numbers of the certified materials used in the item. The manufacturer shall also maintain records identifying the parties to whom he sold camping tentage. Further, he shall maintain records identifying items manufactured from lots of certified material. Records shall be maintained for four (4) years.

(4) Warning label.

24 pt. type

WARNING

16 pt. type

KEEP ALL FLAME AND HEAT SOURCES AWAY FROM THIS TENT FABRIC

12 pt. type

This tent is made with flame-resistant fabric which meets CPAI-84 specifications. It is not fire proof. The fabric will burn if left in continuous contact with any flame source.

The application of any foreign substance to the tent fabric may render the flame resistant properties ineffective.

This warning label or its equivalent must be permanently affixed to the tent at one conspicuous location, and must block letters on a white background. The first paragraph of the body of the label must be placed in a conspicuous location on each carton containing the tent.

3104.4 Affidavit. The affidavit required by Section 3104.2 shall contain all of the information specified in Section 3104.3.

[California Code of Regulations, Title 19, Division 1, §315.(d)] Flame Resistance Standards.

(d) Certificates of Flame Resistance or other documentation affirming the requirements of California Code of Regulations, Title 19, Division 1, Section 315, subsection (a) shall be made available upon request of the enforcement authority.

SECTION 3105—TEMPORARY SPECIAL EVENT STRUCTURES

3105.1 General. Temporary special event structures shall comply with Section 3104, Sections 3105.2 through 3105.8 and ANSI E1.21.

3105.2 Approval. Temporary special event structures required to have a permit, as set forth in Sections 105.5 and 105.6, shall not be erected, operated or maintained for any purpose without first obtaining approval and a permit from the fire code official and the building official.

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3105.3 Use period. Temporary special event structures erected in accordance with ANSI E1.21 shall not be erected for a period of more than six consecutive weeks.

3105.4 Required documents. The following documents shall be submitted to the fire code official and the building official for review before a permit is approved:

1. Construction documents: Construction documents shall be prepared by a registered design professional in accordance with the *California Building Code* and ANSI E1.21 where applicable. Construction documents shall include:
   - 1.1. A summary sheet showing the building code used, design criteria, loads and support reactions.
   - 1.2. Detailed construction and installation drawings.
   - 1.3. Design calculations.
   - 1.4. Operating limits of the structure explicitly outlined by the registered design professional including environmental conditions and physical forces.
   - 1.5. Effects of additive elements such as video walls, supported scenery, audio equipment, vertical and horizontal coverings.
   - 1.6. Means for adequate stability including specific requirements for guying and cross-bracing, ground anchors or ballast for different ground conditions.
2. Designation of responsible party: The owner of the temporary special event structure shall designate in writing a person to have responsibility for the temporary special event structure on the site. The designated person shall have sufficient knowledge of the construction documents, manufacturer's recommendations and operations plan to make judgments regarding the structure's safety and to coordinate with the fire code official.
3. Operations plan: The operations plan shall reflect manufacturer's operational guidelines, procedures for environmental monitoring and actions to be taken under specified conditions consistent with the construction documents.

3105.5 Inspections. Inspections shall comply with Section 109 and Sections 3105.5.1 and 3105.5.2.

3105.5.1 Independent inspector. The owner of a temporary special event structure shall employ a qualified, independent approved agency or individual to inspect the installation of a temporary special event structure.

3105.5.2 Inspection report. The inspecting agency or individual shall furnish an inspection report to the fire code official. The inspection report shall indicate that the temporary special event structure was inspected and was or was not installed in accordance with the approved construction documents. Discrepancies shall be brought to the immediate attention of the installer for correction. Where any discrepancy is not corrected, it shall be brought to the attention of the fire code official and the designated responsible party.

3105.6 Means of egress. The means of egress for temporary special event structures shall comply with Chapter 10.

3105.7 Location. Temporary special event structure shall be located a distance from property lines and buildings to accommodate distances indicated in the construction drawings for guy wires, cross-bracing, ground anchors or ballast. Location shall not interfere with egress from a building or encroach on fire apparatus access roads.

3105.8 Portable fire extinguishers. Portable fire extinguishers shall be provided as required by Section 906.

SECTION 3106—INFLATABLE AMUSEMENT DEVICES

3106.1 Scope. Inflatable amusement devices shall comply with this section.

Exception: Inflatable amusement devices operated on private property where use is not open to the public.

3106.2 General. Inflatable amusement devices shall be designed, anchored, operated and maintained in accordance with the manufacturer's instructions and the requirements of ASTM F2374.

3106.3 Combustible materials. The materials used in the construction of the inflatable amusement device shall meet the flame propagation criteria of *Title 19, California Code of Regulations, Chapter 8.* Additionally, a label and affidavit containing the information required in Sections 3104.3 and 3104.4 of this code shall be permanently affixed to the device.

For California, all fabrics and all interior decorative fabrics or materials shall be flame resistant in accordance with the provisions set forth in CCR, Title 19, Division 1, Chapter 8, and shall meet the requirements of this section. Tops and sidewalls shall be made either from fabric that has been flame-resistant treated with an approved exterior chemical process by an approved application concern, or from inherently flame-resistant fabric approved and listed by the State Fire Marshal (see CCR, Title 19, Division 1, Chapter 8).

3106.4 Electrical equipment and wiring. Electrical equipment, blower motors and temporary wiring for electrical power or lighting shall comply with Section 603.

3106.5 Portable generators. Portable generators shall comply with the applicable provisions of *the California Electrical Code* and with the portable generator requirements of this code.

3106.6 Portable fire extinguishers. Each generator shall be provided with an approved portable fire extinguisher complying with Section 906 that is placed in an approved location.

SECTION 3107—OUTDOOR ASSEMBLY EVENTS

3107.1 Scope. Outdoor assembly events shall comply with this section.

3107.2 General. Outdoor assembly events shall be in accordance with this section and Section 403.11. Temporary structures erected for outdoor assembly events shall comply with this chapter.

3107.2.1 Approval required. Outdoor assembly events shall be approved by the fire code official.

3107.2.2 Permits. An operational permit shall be required as set forth in Section 105.5.

3107.2.3 Access. An approved means of fire apparatus access shall be provided.

3107.2.3.1 Fire service features. Unobstructed access to fire hydrants, drafting sources and other fire protection features shall be maintained at all times.

3107.3 Occupancy and means of egress. The number and location of emergency egress and escape routes shall be approved by the fire code official.

3107.3.1 Occupant load. The fire code official shall establish an occupant load for the event site.

3107.3.2 Maintenance of emergency egress and escape routes. Emergency egress and escape routes shall be maintained at all times.

3107.4 Public safety for events. Outdoor assembly events shall comply with Sections 3107.4.1 through 3107.4.7.

3107.4.1 Public safety plan for gatherings. A public safety plan shall be prepared where required by Section 403.11.2. The public safety plan shall be submitted to the fire code official with the application for an operational permit as required by Section 3107.2.2.

3107.4.2 Weather monitoring person. Where required by the fire code official, the event operator or agent shall designate one qualified individual to continuously monitor local weather reports, forecasts and conditions. Said person shall be responsible for initiating weather-related event mitigation activities, ordering the suspension or cancellation of the outdoor assembly event and issuing the evacuation signal in accordance with the approved public safety plan.

3107.4.3 Crowd managers. Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.11.3.

3107.4.4 Portable fire extinguishers. Approved portable fire extinguishers complying with Section 906 shall be provided and placed in locations approved by the fire code official.

3107.4.5 Smoking. Smoking shall be permitted only in designated areas. Other areas shall have approved “No Smoking” signs conspicuously posted and maintained in accordance with Section 310.

[California Code of Regulations, Title 19, Division 1, §316] Smoking Prohibited.

Smoking is not permitted in any tent and in any adjacent areas where hay or other highly flammable materials are kept. “No Smoking” signs shall be conspicuously posted in all tents open to the public and wherever otherwise specified by the enforcing authority.

3107.4.6 Combustible vegetation. Combustible vegetation that could create a fire hazard shall be removed from the outdoor assembly event area.

3107.4.7 Combustible refuse. Combustible refuse shall be kept in noncombustible containers with tight-fitting or self-closing lids. Combustible refuse shall be removed from the event site at regular intervals to prevent an unsafe accumulation within the event site.

3107.5 Cooking appliances or devices. Outdoor assembly events with concession stands or booths using cooking appliances or devices shall comply with Sections 3107.5.1 through 3107.5.3.

3107.5.1 Separation from tents or structures. Cooking operations shall be in compliance with Section 3108.12.

3107.5.2 Protection. Cooking equipment using combustible oils or solids shall meet the following:

1. A noncombustible lid shall be immediately available. The lid shall be of sufficient size to cover the cooking well completely.
2. The equipment shall be placed on a noncombustible surface.
3. An approved portable fire extinguisher for protection from cooking grease fires shall be provided at a location approved by the fire code official.

3107.5.3 Liquefied petroleum gas (LP-gas). The use of liquefied petroleum gas (LP-gas) shall be in accordance with Chapter 61.

3107.6 Electrical equipment and wiring. Outdoor assembly events with concession stands or booths using electrical equipment and temporary wiring for electrical power or lighting shall comply with the applicable provisions of *the California Electrical Code* and Sections 3107.6.1 through 3107.6.3.

3107.6.1 Outdoor use. Electrical equipment and wiring shall be listed and labeled for outdoor use.

3107.6.2 Generators. Generators shall be installed not less than 10 feet (3048 mm) from combustible materials, and shall be isolated from the public by physical guard, fence or enclosure installed not less than 3 feet (914 mm) away from the internal combustion power source.

3107.6.3 Portable fire extinguishers. Each generator shall be provided with an approved portable fire extinguisher complying with Section 906.

SECTION 3108—OPERATIONAL REQUIREMENTS

3108.1 General. Temporary and permanent tents and membrane structures shall comply with this section.

3108.2 Combustible materials. Hay, straw, shavings or similar combustible materials shall not be located within any tent or membrane structure containing an assembly occupancy, except the materials necessary for the daily feeding and care of animals. Sawdust and shavings utilized for a public performance or exhibit shall not be prohibited provided that the sawdust and shavings are kept damp. Combustible materials shall not be permitted under stands or seats at any time.

[California Code of Regulations, Title 19, Division 1, §315.(b)] Flame Resistance Standards.

(b) Sawdust, shavings or other combustible material used on the floor or ground shall be made flame resistant or when approved by the enforcing authority shall be kept adequately damp when tent is occupied.

[California Code of Regulations, Title 19, Division 1, §326.(b)] Hazard Abatement.

(b) Hay, straw, trash and other similar flammable material shall be stored more than 50 feet from any tent except upon approval of the enforcing authority.

***Exception:** Tents to which the public is not admitted.*

3108.3 Smoking. Smoking shall not be permitted in tents or membrane structures. Approved "No Smoking" signs shall be conspicuously posted in accordance with Section 310.

[California Code of Regulations, Title 19, Division 1, §316] Smoking Prohibited.

Smoking is not permitted in any tent and in any adjacent areas where hay or other highly flammable materials are kept. "No Smoking" signs shall be conspicuously posted in all tents open to the public and wherever otherwise specified by the enforcing authority.

3108.4 Open or exposed flame. Open flame or other devices emitting flame, fire or heat or any flammable or combustible liquids, gas, charcoal or any other unapproved devices shall not be permitted inside or located within 10 feet (3048 mm) of the tent or membrane structures while open to the public unless approved by the fire code official.

Exception: Cooking devices shall comply with Section 3108.12.

[California Code of Regulations, Title 19, Division 1, §317] Fireworks and Open Flames.

Fireworks, open flame or any device emitting flame or spark shall not be used in or immediately adjacent to any tent while open to the public, except when approved in writing by the enforcing authority.

3108.5 Fireworks. Fireworks shall not be used within 100 feet (30 480 mm) of tents or membrane structures.

3108.6 Spot lighting. Spot or effect lighting shall only be by electricity, and all combustible construction located within 6 feet (1829 mm) of such equipment shall be protected with approved noncombustible insulation not less than $9^1/_4$ inches (235 mm) thick.

3108.7 Safety film. Motion pictures shall not be displayed in tents or membrane structures unless the motion picture film is safety film.

3108.8 Clearance. There shall be a clearance of not less than 3 feet (914 mm) between the fabric envelope and all contents located inside membrane structures.

3108.9 Portable fire extinguishers. Approved portable fire extinguishers complying with Section 906 shall be provided and placed in locations as required by the *California Code of Regulations, Title 19, Division 1, Chapter 2, Article 3, Section 319.*

[California Code of Regulations, Title 19, Division 1, §319.(a) through (c)] Fire Extinguishers and Other Fire Protection Equipment.

(a) One Class 2-A fire extinguisher shall be provided in every tent having a floor area between 500 square feet and 1,000 square feet plus one 2-A fire extinguisher in each auxiliary adjacent tent. One additional extinguisher shall be provided for each additional 2000 square feet or fraction thereof.

(b) At least one Class 10 B-C fire extinguisher shall be provided with each generator or transformer.

(c) At least one Class 10 B-C fire extinguisher shall be provided in kitchen, dining areas and at locations where flammable or combustible liquids or flammable gases are used, stored or dispensed.

3108.10 Fire protection equipment. Fire hose lines, water supplies and other auxiliary fire equipment shall be maintained at the site in such numbers and sizes as required by the fire code official.

[California Code of Regulations, Title 19, Division 1, §319.(d) and (e)] Fire Extinguishers and Other Fire Protection Equipment.

(d) Tents having a capacity of 1,000 or more persons shall be protected on each of the long sides with fire hose lines of at least $1^1/_2$-inch internal diameter and of sufficient length to reach either end of the tent. The water supply shall be either from the public water mains or from tanks having a capacity of not less than 500 gallons. There shall be at least 65 pounds of flowing pressure at the nozzle of the hose line when a $^1/_2$-inch tip is used.

(e) The enforcing authority may modify or waive any of the requirements of this section [Title 19, Division 1, Section 319] and may accept other types of fire extinguishing equipment in lieu of that required by Title 19, Division 1 regulations if, in the authorities' opinion, reasonable and adequate protection will be afforded.

3108.11 Occupant load factors. The occupant load allowed in an assembly structure, or portion thereof, shall be determined in accordance with Chapter 10.

3108.12 Heating and cooking equipment. Temporary heating and cooking equipment shall be in accordance with Chapter 41. Permanent heating and cooking equipment shall be in accordance with Chapter 6 and Sections 3108.12.1 through 3108.12.3.

3108.12.1 Installation. Heating or cooking equipment, tanks, piping, hoses, fittings, valves, tubing and other related components shall be installed as specified in the *International Fuel Gas Code* and the *California Mechanical Code*, and shall be approved by the fire code official.

3108.12.2 Venting. Gas, liquid and solid fuel-burning equipment designed to be vented shall be vented to the outside air as specified in the *International Fuel Gas Code* and the *California Mechanical Code*. Such vents shall be equipped with approved spark arresters where required. Where vents or flues are used, all portions of the tent or membrane structure shall be not less than 12 inches (305 mm) from the flue or vent.

3108.12.3 Location. Cooking and heating equipment shall not be located within 10 feet (3048 mm) of exits or combustible materials.

3108.13 Flammable and combustible liquids. The storage of flammable and combustible liquids and the use of flammable-liquid-fueled equipment shall be in accordance with Sections 3108.13.1 through 3108.13.3.

3108.13.1 Use. Flammable-liquid-fueled equipment shall not be used in tents or membrane structures.

3108.13.2 Flammable and combustible liquid storage. Flammable and combustible liquids shall be stored outside in an approved manner not less than 50 feet (15 240 mm) from tents or membrane structures. Storage shall be in accordance with Chapter 57.

[California Code of Regulations, Title 19, Division 1, §324.(a) and (b)] Flammable and Combustible Liquids.

(a) Liquids having a flash point below 200°F shall not be stored in any tent nor less than 50 feet from any tent.

(b) Flammable or combustible liquids shall be stored and dispensed in accordance with the provisions of the California Fire Code. The enforcing authority may permit limited quantities of flammable or combustible liquids required for display and normal merchandising.

3108.13.3 Refueling. Refueling shall be performed in an approved location not less than 20 feet (6096 mm) from tents or membrane structures.

3108.14 Display of motor vehicles. Liquid- and gas-fueled vehicles and equipment used for display within tents or membrane structures shall be in accordance with Sections 3108.14.1 through 3108.14.5.3.

3108.14.1 Batteries. Batteries shall be disconnected except where the fire code official requires that the batteries remain connected to maintain safety features.

3108.14.2 Fuel. Vehicles or equipment shall not be fueled or defueled within the tent or membrane structure.

3108.14.2.1 Quantity limit. Fuel in the fuel tank shall not exceed one-quarter of the tank capacity or 5 gallons (19 L), whichever is less.

3108.14.2.2 Inspection. Fuel systems shall be inspected for leaks.

3108.14.2.3 Closure. Fuel tank openings shall be locked and sealed to prevent the escape of vapors.

3108.14.3 Location. The location of vehicles or equipment shall not obstruct means of egress.

3108.14.4 Places of assembly. When a compressed natural gas (CNG) or liquefied petroleum gas (LP-gas) powered vehicle is parked inside a place of assembly, all of the following conditions shall be met:

1. The quarter-turn shutoff valve or other shutoff valve on the outlet of the CNG or LP-gas container shall be closed and the engine shall be operated until it stops. Valves shall remain closed while the vehicle is indoors.
2. The hot lead of the battery shall be disconnected.
3. Dual-fuel vehicles equipped to operate on gasoline and CNG or LP-gas shall comply with this section and Sections 3108.14.1 through 3108.14.3 for gasoline-powered vehicles.

3108.14.5 Competitions and demonstrations. Liquid- and gas-fueled vehicles and equipment used for competition or demonstration within a tent or membrane structure shall comply with Sections 3108.14.5.1 through 3108.14.5.3.

3108.14.5.1 Fuel storage. Fuel for vehicles or equipment shall be stored in approved containers in an approved location outside of the structure in accordance with Section 3108.13.2.

3108.14.5.2 Fueling. Refueling shall be performed outside of the structure in accordance with Section 3108.13.3.

3108.14.5.3 Spills. Fuel spills shall be cleaned up immediately.

3108.15 Separation of generators. Generators and other internal combustion power sources shall be separated from tents or membrane structures by not less than 20 feet (6096 mm) and shall be isolated from contact with the public by fencing, enclosure or other approved means.

3108.16 Standby personnel. Where, in the opinion of the fire code official, it is essential for public safety in a tent or membrane structure used as a place of assembly or any other use where people congregate, because of the number of persons, or the nature of the performance, exhibition, display, contest or activity, the owner, agent or lessee shall employ one or more qualified persons, as required and approved, to remain on duty during the times such places are open to the public, or when such activity is being conducted.

[California Code of Regulations, Title 19, Division 1, §320] Fire Safety Personnel.

The owners or operators of any tent used as a place of assemblage shall provide at least one qualified fire safety person in every tent having a capacity of 500 persons and one additional qualified person for each 1,000 additional persons or fraction thereof. Such persons shall be on duty in the tent at all times when the tent is open to the public. They shall be proficient in the handling of fire extinguishers and equipment and shall be familiar with the fire and panic safety regulations. The individual designated under this section shall meet the approval of the fire authority having jurisdiction.

Exception: *The enforcing authority may waive or modify the provisions of this section if, in his opinion, public safety will not be jeopardized.*

3108.16.1 Duties. Before each performance or the start of such activity, standby personnel shall keep diligent watch for fires during the time such place is open to the public or such activity is being conducted and take prompt measures for extinguishment of fires that occur and assist in the evacuation of the public from the structure.

3108.16.2 Crowd managers. There shall be trained crowd managers or trained crowd supervisors at a ratio of one crowd manager or supervisor for every 250 occupants, as approved.

3108.17 Combustible vegetation. Combustible vegetation that could create a fire hazard shall be removed from the area occupied by a tent or membrane structure, and from areas within 30 feet (9144 mm) of such structures.

[California Code of Regulations, Title 19, Division 1, §326.(a)] Hazard Abatement.

(a) All flammable vegetation within 50 feet of any tent shall be removed.

3108.18 Combustible waste material. The floor surface inside tents or membrane structures and the grounds outside and within a 30-foot (9144 mm) perimeter shall be kept free from combustible waste and other combustible materials that could create a fire hazard. Such waste shall be stored in approved containers and removed from the premises not less than once a day during the period the structure is occupied by the public.

[California Code of Regulations, Title 19, Division 1, §326.(c)] Hazard Abatement.

(c) Combustible waste shall not be permitted to accumulate on the grounds either inside or outside of tents. Such waste shall be stored in approved containers until removed from the premises.

3108.19 Obstructions. *Exits, aisles and passageways shall not be blocked or have their minimum clear width obstructed in any manner by ticket offices, turnstiles, concessions, chairs, equipment, animal chutes, poles or guy ropes, or anything whatsoever, nor shall they be blocked by persons for whom no seats are available.*

In occupancies having fixed seating, and on request of the owner or manager, the enforcing agency may permit modifications from the provisions of this code to accommodate seating for handicapped persons using mechanical aids such as, but not limited to, walkers and wheelchairs.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 32 – HIGH-PILED COMBUSTIBLE STORAGE

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
Table 3203.8			X																				
Table 3206.2			X																				
3203.8			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

32

HIGH-PILED COMBUSTIBLE STORAGE

User notes:

About this chapter: Chapter 32 provides guidance for reasonable protection of life from hazards associated with the storage of combustible materials in closely packed piles or on pallets, in racks or on shelves where the top of storage is greater than 12 feet in height, or 6 feet for high-hazard commodities. It provides requirements for identifying various classes of commodities; and general fire and life safety features including storage arrangements, smoke and heat venting, fire department access and housekeeping and maintenance. This chapter attempts to define the potential fire severity and, in turn, determine fire and life safety protection measures needed to control and in some cases suppress a potential fire. This chapter does not cover miscellaneous combustible material storage as regulated in Section 315.

SECTION 3201—GENERAL

3201.1 Scope. *H*igh-piled combustible storage shall be in accordance with this chapter. In addition to the requirements of this chapter, the following material-specific requirements shall apply:

1. Aerosols shall be in accordance with Chapter 51.
2. Flammable and combustible liquids shall be in accordance with Chapter 57.
3. Hazardous materials shall be in accordance with Chapter 50.
4. Storage of combustible paper records shall be in accordance with NFPA 13.
5. Storage of combustible fibers shall be in accordance with Chapter 37.
6. General storage of combustible material shall be in accordance with Chapter 3.

3201.2 Permits. A permit shall be required as set forth in Sections 105.5 and 105.6.

3201.3 Construction documents. At the time of building permit application for new structures designed to accommodate high-piled storage or for requesting a change of occupancy/use, and at the time of application for a storage permit, plans and specifications shall be submitted for review and approval. In addition to the information required by the *California Building Code*, the storage permit submittal shall include the information specified in this section. The construction documents shall include all of the following:

1. Floor plan of the building showing locations and dimensions of high-piled storage areas.
2. Usable storage height for each storage area.
3. Number of tiers within each rack, if applicable.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. Maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of commodities that are banded or encapsulated.
9. Location of required fire department access doors.
10. Type of fire protection systems.
11. Location of valves controlling the water supply of ceiling and in-rack sprinklers.
12. Type, location and specifications of smoke removal and curtain board systems.
13. Dimension and location of transverse and longitudinal flue spaces.
14. Additional information regarding required design features, commodities, storage arrangement and fire protection features within the high-piled storage area shall be provided at the time of permit, where required by the fire code official.

3201.3.1 Approved construction documents. Following approval of the construction documents, a copy of the approved plans shall be maintained on the premises in an approved location.

3201.3.2 Approved storage layout. A floor plan, of legible size, shall be provided, mounted on a wall and protected from damage. The floor plan shall be mounted in an approved location and show the following:

1. Locations, dimensions and rack layout of high-piled storage areas.
2. Design storage height for each storage area.
3. Types of commodities.
4. Commodity clearance between top of storage and the sprinkler deflector for each storage arrangement.
5. Aisle dimensions between each storage array.
6. For palletized and solid-piled storage, the maximum pile volume for each storage array.
7. Location and classification of commodities in accordance with Section 3203.
8. Location of required fire department access doors.
9. Location of valves controlling the water supply of ceiling and in-rack sprinklers.

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3201.4 Fire safety and evacuation plan. Where required by the Section 403, a fire safety and evacuation plan shall be submitted at the time of permit application for review and approval. A copy of the approved fire safety and evacuation plan shall be maintained on the premises in an approved location.

SECTION 3202—DEFINITIONS

3202.1 Definitions. The following terms are defined in Chapter 2:

ARRAY.

ARRAY, CLOSED.

AUTOMATED RACK STORAGE.

BIN BOX.

COMMODITY.

EARLY SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER.

EXPANDED PLASTIC.

EXTRA-HIGH-RACK COMBUSTIBLE STORAGE.

HIGH-PILED COMBUSTIBLE STORAGE.

HIGH-PILED STORAGE AREA.

LONGITUDINAL FLUE SPACE.

MANUAL STOCKING METHODS.

MECHANICAL STOCKING METHODS.

SHELF STORAGE.

SOLID SHELVING.

TRANSVERSE FLUE SPACE.

SECTION 3203—COMMODITY CLASSIFICATION

3203.1 Classification of commodities. Commodities shall be classified as Class I, II, III, IV or high hazard in accordance with Sections 3203.2 through 3203.10.3. Materials listed within each commodity classification are assumed to be unmodified for improved combustibility characteristics. Use of flame-retarding modifiers or the physical form of the material could change the classification.

3203.2 Class I commodities. Class I commodities are noncombustible products in ordinary corrugated cartons with or without single-thickness dividers, or in ordinary paper wrappings with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

3203.3 Class II commodities. Class II commodities are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

3203.4 Class III commodities. Class III commodities are products of wood, paper, natural fiber cloth, or Group C plastics or products thereof, with or without wood pallets. The amount of Group A plastics shall be limited in accordance with Section 3203.9.

3203.5 Class IV commodities. Class IV commodities are Class I, II or III products containing Group A plastics in ordinary corrugated cartons; Class I, II and III products with Group A plastic packaging; Group B plastics; and free-flowing Group A plastics with or without wood pallets. The total amount of nonfree-flowing Group A plastics shall be limited in accordance with Section 3203.9.

3203.6 High-hazard commodities. High-hazard commodities are products presenting special fire hazards beyond those of Class I, II, III or IV. Group A plastics not otherwise classified are included in this class.

3203.7 Classification of plastics. Plastics shall be designated as Group A, B or C in accordance with Sections 3203.7.1 through 3203.7.3.

3203.7.1 Group A plastics. Group A plastics are plastic materials having a heat of combustion that is much higher than that of ordinary combustibles, and a burning rate higher than that of Group B plastics.

3203.7.2 Group B plastics. Group B plastics are plastic materials having a heat of combustion and a burning rate higher than that of ordinary combustibles, but not as high as those of Group A plastics.

3203.7.3 Group C plastics. Group C plastics are plastic materials having a heat of combustion and a burning rate similar to those of ordinary combustibles.

3203.8 Examples of commodity classification. Table 3203.8 shall be used to determine the commodity classification for various products and materials. Products not found in the list shall be classified based on the classification descriptions in Sections 3203.2 through 3203.6 and the products they most nearly represent in Table 3203.8. Table 3203.8 considers the product and the packaging if listed with the item. Products with additional packaging consisting of Group A plastics shall be classified in accordance with Section 3203.9.

The commodity classifications are based on products with, or without, wood pallets. Where plastic pallets are used, the commodity classification shall be modified in accordance with Section 3203.10.

TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Aerosols	Level 1	Class III (See Chapter 51)
	Level 2	Class IV (See Chapter 51)
	Level 3	High-hazard (See Chapter 51)
Batteries	Dry cells (excludes lithium, lithium-ion and other similar exotic metals or combustible electrolyte); without blister packing (if blister packed, refer to the commodity classification definitions)	Class I
	Dry cells (nonlithium or similar exotic metals); in blister packing; cartoned	Class II
	Vehicle; any size (for example, automobile or truck); empty plastic casing	High-hazard (Group A unexpanded)
	Vehicle; large (in other words, truck or larger); dry or wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	High-hazard (Group A unexpanded)
	Vehicle; small (for example, automobile); wet cells (excludes lithium-ion and other cells containing combustible electrolytes)	Class I
	Lithium-ion *(excludes lithium-ion installed in the equipment or appliance it powers)*	High-hazard
Biomass	Circular baled corn stover	Class IV
	Rectangular baled corn stover	Class III
	Rectangular baled switchgrass	High-hazard
Empty containers	Noncombustible	Class I
	PET	Class IV
	Rigid plastic (not including PET)	High-hazard (Group A unexpanded)
	Wood; solid sided (such as crates, boxes)	Class II
Film rolls, including photographic	Polypropylene, polyester, polyethylene; rolled on any reel type	High-hazard (Group A unexpanded)
	35 mm metal film cartridges in polyethylene cans; cartoned	Class III
	Motion picture or bulk rolls in polycarbonate, polyethylene or in metal cans; polyethylene bagged; cartoned	Class II
	Rolls in polycarbonate plastic cassettes; cartoned	Class IV
	Photographic paper; sheets; bagged in polyethylene; cartoned	Class III
Flammable and combustible liquids	Glycol in combustible containers (50 percent or greater)	High-hazard
	Lacquers, which dry by solvent evaporation, in metal cans or cartons	High-hazard
	Lighters; butane; blister-packed; cartoned	High-hazard (Group A unexpanded)
	Over 20- and up to 50-percent alcohol (such as alcoholic beverages, hair spray); up to 1-gallon glass bottles or jars; in racks; cartoned	Class III
	Over 20- and up to 50-percent alcohol (such as alcoholic beverages, hair spray); up to 1-gallon glass bottles or jars; palletized; cartoned	Class IV
	Over 20- and up to 50-percent alcohol (such as alcoholic beverages, hair spray); up to 1-gallon plastic bottles or jars; cartoned	Class IV
	Up to 20-percent alcohol (such as alcoholic beverages, flavoring extracts); greater than 5-gallon plastic containers with wall thickness greater than 0.25 inch	High-hazard (Group A unexpanded)
	Up to 20-percent alcohol (such as alcoholic beverages, flavoring extracts); metal, glass or ceramic containers	Class I
	Up to 20-percent alcohol (such as alcoholic beverages, flavoring extracts); plastic containers greater than 5 gallons and wall thickness up to $^1/_4$ inch	Class II
	Up to 20-percent alcohol (such as alcoholic beverages, flavoring extracts); up to 5-gallon plastic bottles or jars	Class I
	Up to 20-percent alcohol (such as alcoholic beverages, flavoring extracts); wood containers	Class II

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Flammable and combustible liquids—continued	Lubricating or hydraulic fluid in plastic containers	High-hazard
	Nail polish; up to 2-ounce glass bottles or jars; cartoned	Class IV
	Nail polish; up to 2-ounce plastic bottles or jars; cartoned	High-hazard (Group A unexpanded)
Flammable solids	Except solid combustible metals	High-hazard
Food products, frozen	In nonwaxed or nonplastic packaging	Class I
	In plastic trays	Class III
	In waxed or plastic-coated paper packaging	Class II
Food products, nonfrozen	Butter (stick or whipped spread) or margarine (up to 50-percent oil)	Class III
	Butter; whipped spread	Class III
	Dry foods (such as baked goods, candy, cereals, cheese, chocolate, cocoa, coffee, grains, granular sugar, nuts); bagged or cartoned	Class III
	Foods (such as coffee, fish products, fruit, meat products, nuts, poultry); metal cans	Class I
	Fruits and vegetables (noncombustible semiliquid); crushed; plastic containers up to 5 gallons	Class I
	Fruits and vegetables; fresh; wood spacers, nonplastic trays or containers	Class I
	Margarine; over 50- and up to 80-percent oil	High-hazard (Group A unexpanded)
	Meat; fresh; no plastic packaging; uncartoned	Class I
	Meat; fresh; no plastic packaging; cartoned	Class II
	Meat; fresh; plastic tray	Class III
	Milk; any container; stored in solid plastic crates	High-hazard (Group A unexpanded)
	Milk; paper containers, or plastic bottles or jars up to 5 gallons	Class I
	Salt; bagged	Class I
	Salt; cartoned	Class II
	Snack foods (such as potato chips); plasticized aluminum bags; cartoned	High-hazard (Group A unexpanded)
	Syrup; wooden container	Class II
Furniture and bedding	Box spring; standard (minimal plastic materials)	Class III
	Box spring; wrapped in plastic cover	Class IV
	Furniture and bedding; with foam cushioning	High-hazard (Group A expanded)
	Furniture; metal (such as file cabinets or desks with minimal plastic trim); cartoned	Class I
	Furniture; wood (such as doors, windows, cabinets); no plastic coverings or foam cushioning	Class III
	Furniture; wood; plastic coverings; nonexpanded plastic trim	Class IV
	Mattress; foam (in finished form)	High-hazard (Group A expanded)
	Pillows, foam rubber and foam plastics	High-hazard (Group A expanded)
Housing materials and appliances	Appliances; major (for example, stoves, refrigerators); no appreciable plastic interior or exterior trim; cartoned	Class II
	Appliances; major (for example, stoves, refrigerators); no appreciable plastic interior or exterior trim; uncartoned	Class I
	Appliances; no appreciable plastic exterior trim (interior of unit can have appreciable plastic)	Class III
	Carpet tiles; cartoned	High-hazard (Group A unexpanded)
	Fiberglass insulation; paper-backed rolls; bagged or unbagged	Class IV
	Floor coverings; vinyl, stacked tiles	Class IV

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Housing materials and appliances—continued	Floor coverings; vinyl; rolled	High-hazard (Group A unexpanded)
	Gypsum board	Class I
	Housing materials (such as sinks, countertops); noncombustible, cartoned or crated	Class II
	Light fixtures; nonplastic; cartoned	Class II
	Paint; oil-based; friction-top metal containers; cartoned	Class IV
	Paint; water-based (latex); friction-top metal containers; cartoned	Class I
	Paper; asphalt; rolled, horizontal or vertical storage	High-hazard
	Roofing shingles; asphalt-coated fiberglass	Class III
	Roofing shingles; asphalt-impregnated felt	Class IV
Miscellaneous	Ammunition; small arms and shotgun; cartoned	Class IV
	Charcoal; mineral-spirit impregnated; bagged	High-hazard (Group A expanded)
	Charcoal; standard (nonmineral-spirit impregnated); bagged	Class III
	Fertilizers; nitrates; bagged	Class II
	Fertilizers; phosphates; bagged	Class I
	Leather hides; baled	Class II
	Leather; finished products (such as shoes, jackets, gloves, bags, luggage, belts)	Class III
	Motors; electric	Class I
	Pallets and flats that are idle; combustible	High-hazard
	Shock absorbers; metal dust cover	Class II
	Shock absorbers; plastic dust cover	Class III
	Skis; wood	Class III
	Skis; composite materials (such as plastic, fiberglass, foam)	Class IV
	Tobacco products; cartoned	Class III
	Toys; stuffed; foam or synthetic	High-hazard (Group A expanded)
	Transformer; dry or empty (in other words, void of oil)	Class I
Noncombustible liquids	Liquids or semiliquids; PET containers greater than 5 gallons having a nominal wall thickness greater than $^1/_4$ inch	Class IV
	Liquids or semiliquids; PET containers up to 5 gallons having a nominal wall thickness less than $^1/_4$ inch	Class I
	Liquids or semiliquids (such as crushed fruits and vegetables); plastic containers up to 5-gallon capacity	Class I
	Liquids or semiliquids; plastic (except PET) containers greater than 5-gallon capacity having a nominal wall thickness greater than $^1/_4$ inch	High-hazard (Group A unexpanded)
	Liquids or semiliquids; plastic (except PET) containers greater than 5-gallon capacity having a nominal wall thickness up to $^1/_4$ inch	Class II
	Liquids; cardboard drink boxes, plastic coated, wax coated, and/or aluminum lined; uncartoned or on corrugated carton trays with plastic sheeting	Class I
	Liquids; cardboard drink boxes, plastic coated, wax coated, and/or aluminum lined; stored in plastic containers	High-hazard (Group A unexpanded)
	Liquids; glass bottles or jars; cartoned	Class I
	Liquids; less than 5-gallon plastic containers	Class I
	Liquids; pharmaceuticals (nonflammable); glass bottles or jars; cartoned	Class II
	Liquids; plastic bottles or jars; stored in open or solid plastic crates	High-hazard (Group A unexpanded)

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Paper products	Book signatures (paper part of book without hard cover)	Class II
	Cartons (such as cardboard flats); corrugated; partially assembled	Class IV
	Cartons (such as cardboard flats); corrugated; unassembled in neat piles	Class III
	Cartons; wax coated, single-walled corrugated	High-hazard (Group A unexpanded)
	Cellulosic paper products; nonwax coated (such as books, cardboard games, cartoned tissue products, magazines, newspapers, paper cups, paper plates, paper towels, plastic-coated paper food containers, stationary)	Class III
	Cellulosic paper products; wax coated (such as paper plates, cups); loosely packed; cartoned	High-hazard (Group A unexpanded)
	Cellulosic paper products; wax coated (such as paper plates, cups); nested; cartoned	Class IV
	Matches; paper-type; cartoned	Class IV
	Matches; wooden; cartoned	High-hazard (Group A unexpanded)
	Rolled; lightweight; in storage racks	Class IV
	Rolled; medium or heavyweight; in storage racks or onside	Class III
	Rolled; in horizontal storage or vertical storage that is banded or protected with an approved wrap	Class III
	Rolled; in vertical storage that is unbanded or not protected with an approved wrap	High-hazard
	Tissue products; plastic wrapped; cartoned	Class III
	Tissue products; plastic wrapped; uncartoned	High-hazard (Group A unexpanded)
Plastic, rubber	ABS (Acrylonitrile-butadiene-styrene copolymer)	High-hazard (Group A unexpanded)
	Acetal (polyformaldehyde)	High-hazard (Group A unexpanded)
	Acrylic (polymethyl methacrylate)	High-hazard (Group A unexpanded)
	Automobile bumpers and dashboards	High-hazard (Group A expanded)
	Butyl rubber	High-hazard (Group A unexpanded)
	Cellulose acetate	Class IV (Group B plastic)
	Cellulose acetate butyrate	High-hazard (Group A unexpanded)
	Chloroprene rubber	Class IV (Group B plastic)
	Containers; Nonexpanded plastic gridded or solid; collapsed or nested with no air spaces	High-hazard (Group A unexpanded)
	ECTFE (ethylene-chlorotrifluoroethylene copolymer)	Class IV (Group B plastic)
	EPDM (ethylene-propylene rubber)	High-hazard (Group A unexpanded)
	ETFE (ethylene-tetrafluoroethylene copolymer)	Class IV (Group B plastic)
	Ethyl cellulose	High-hazard (Group A unexpanded)
	FEP (fluorinated ethylene-propylene copolymer)	Class IV (Group B plastic)
	FRP (fiberglass-reinforced polyester)	High-hazard (Group A unexpanded)

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Plastic, rubber—continued	Melamine (melamine formaldehyde)	Class III (Group C plastic)
	Nitrile rubber (acrylonitrile-butadiene rubber)	High-hazard (Group A unexpanded)
	Nylon (nylon 6, nylon 6/6)	High-hazard (Group A unexpanded)
	PCTFE (polychlorotrifluoroethylene)	Class III (Group C plastic)
	PET (Polyethylene terephthalate-thermoplastic polyester)	High-hazard (Group A unexpanded)
	Phenolic	Class III (Group C plastic)
	Plastics; stored in fully closed and solid (no openings) metal containers	Class I
	Polybutadiene	High-hazard (Group A unexpanded)
	Polycarbonate	High-hazard (Group A unexpanded)
	Polyester elastomer	High-hazard (Group A unexpanded)
	Polyethylene	High-hazard (Group A unexpanded)
	Polypropylene	High-hazard (Group A unexpanded)
	Polystyrene; foam products (such as plates, cups)	High-hazard (Group A expanded)
	Polystyrene; rigid products	High-hazard (Group A unexpanded)
	Polyurethane	High-hazard (Group A expanded)
	PTFE (polytetrafluoroethylene)	Class III (Group C plastic)
	PVC (polyvinyl chloride) products; plasticizer content 20 percent or less	Class III (Group C plastic)
	PVC (polyvinyl chloride) products; plasticizer content greater than 20 percent	High-hazard (Group A unexpanded)
	PVC resins; bagged	Class III (Group C plastic)
	PVDC (polyvinylidene chloride)	Class III (Group C plastic)
	PVDF (polyvinylidene fluoride)	Class III (Group C plastic)
	PVF (polyvinyl fluoride)	High-hazard (Group A unexpanded)
	Pyroxylin	High-hazard
	Rubber; natural in blocks; cartoned	High-hazard (Group A unexpanded)
	Rubber; natural; expanded	High-hazard (Group A expanded)
	Rubber; natural; Nonexpanded	High-hazard (Group A unexpanded)
	Rubber; synthetic (santoprene)	High-hazard (Group A unexpanded)
	Rubber tires	High-hazard

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Plastic, rubber—continued	SAN (styrene acrylonitrile)	High-hazard (Group A unexpanded)
	SBR (styrene-butadiene rubber)	High-hazard (Group A unexpanded)
	Silicone rubber	Class IV (Group B plastic)
	Urea (urea formaldehyde)	Class III (Group C plastic)
Plastic containers	Bottles or jars greater than 1 gallon containing noncombustible solids	High-hazard (Group A unexpanded)
	Bottles or jars up to 1 gallon containing noncombustible solids	High-hazard (Group A unexpanded)
Powders, pills	Pharmaceutical pills; glass bottles or jars; cartoned	Class II
	Pharmaceutical pills; plastic bottles or jars; cartoned	Class IV
	Polyvinyl alcohol (PVA) resins; bagged	Class IV
	Powders; combustible (ordinary—such as sugar or flour); free-flowing; bagged	Class II
	Powders; noncombustible free-flowing powdered or granular materials (such as cement, calcium chloride, clay, iron oxide, sodium chloride, sodium silicate); bagged	Class I
	Powders; noncombustible; glass bottles or jars; cartoned	Class I
	Powders; noncombustible; PET bottles or jars	Class II
	Powders; noncombustible; plastic (other than PET) bottles or jars; uncartoned	High-hazard (Group A unexpanded)
	Powders; noncombustible; plastic bottles or jars greater than 1-gallon capacity	High-hazard (Group A unexpanded)
	Powders; noncombustible; plastic bottles or jars up to 1-gallon capacity; cartoned	Class IV
Textile materials and products	Cloth; natural fibers; baled	Class III
	Cloth; synthetic cloth	Class IV
	Clothing; natural fibers (such as wool, cotton) and viscose	Class III
	Cotton; cartoned	Class III
	Diapers; cotton or linen	Class III
	Diapers; plastic or nonwoven fabric; cartoned	Class IV
	Diapers; plastic or nonwoven fabric; plastic-wrapped; uncartoned	High-hazard (Group A unexpanded)
	Fabric; rayon and nylon	Class IV
	Fabric; synthetic (except rayon and nylon); greater than 50/50 blend	High-hazard (Group A unexpanded)
	Fabric; synthetic (except rayon and nylon); up to 50/50 blend	Class III
	Fabric; vinyl-coated (such as tablecloth); cartoned	High-hazard (Group A unexpanded)
	Fibers; rayon and nylon; baled	Class IV
	Fibers; synthetic (except rayon and nylon); baled	High-hazard (Group A unexpanded)
	Thread or yarn; rayon and nylon; wood or paper spools	Class IV
	Thread or yarn; rayon or nylon; plastic spools	High-hazard (Group A unexpanded)
	Thread or yarn; synthetic (except rayon and nylon); greater than 50/50 blend; paper or wood spools	Class IV
	Thread or yarn; synthetic (except rayon and nylon); greater than 50/50 blend; plastic spools	High-hazard (Group A unexpanded)

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TABLE 3203.8—EXAMPLES OF COMMODITY CLASSIFICATION—continued		
PRODUCT CATEGORY	**PRODUCT**	**CLASSIFICATION**
Textile materials and products—continued	Thread or yarn; synthetic (except rayon and nylon); up to 50/50 blend; plastic spools	High-hazard (Group A unexpanded)
	Thread or yarn; synthetic (except rayon and nylon); up to 50/50 blend; wood or paper spools	Class III
Wax products	Candles	High-hazard (Group A expanded)
	Paraffin or petroleum wax; blocks	High-hazard (Group A expanded)
Wire, cable, spools	Spools; plastic; empty	High-hazard (Group A unexpanded)
	Spools; wood; empty	Class III
	Wire or cable; PVC insulated; metal or wood spools	Class II
	Wire or cable; PVC insulated; plastic spools	Class IV
	Wire; bare; metal spools; uncartoned	Class I
	Wire; bare; metal spools; cartoned	Class II
	Wire; bare; plastic spools; cartoned	Class IV
	Wire; bare; plastic spools; uncartoned	High-hazard (Group A unexpanded)
	Wire; bare; wood or cardboard spools	Class II
Wood products	Wood patterns	Class IV
	Wood products (such as fiberboard, lumber, particle board, plywood, pressboard with smooth ends and edges); bundled solid blocks	Class II
	Wood products (such as fiberboard, lumber, particle board, plywood, pressboard with smooth ends and edges); unbundled or nonsolid blocks	Class III
	Wood products (such as toothpicks, clothespins and hangers)	Class III
For SI: 1 inch = 25.4 mm, 1 gallon = 3.8 L, 1 ounce = 29.57 ml.		

3203.9 Limited quantities of Group A plastics in mixed commodities. Figures 3203.9(1) and 3203.9(2) shall be used to determine the commodity classification based on the quantity of Group A plastics in the following situations:

1. The product is not listed in Table 3203.8 and contains Group A plastics.
2. The commodity contains Group A plastics and is not classified as high hazard in Table 3203.8.
3. The product listing in Table 3203.8 does not specifically include packaging, and the packaging material includes Group A plastics.

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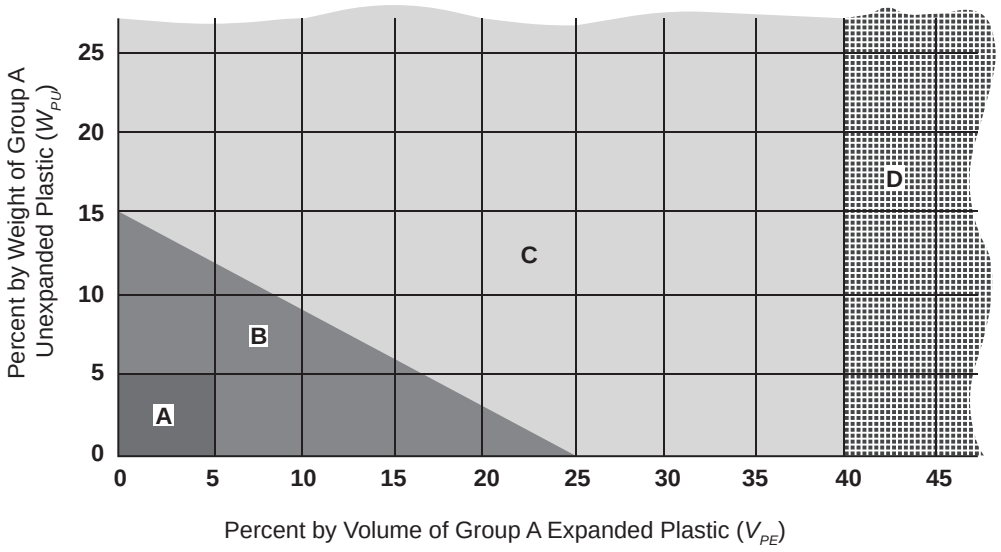
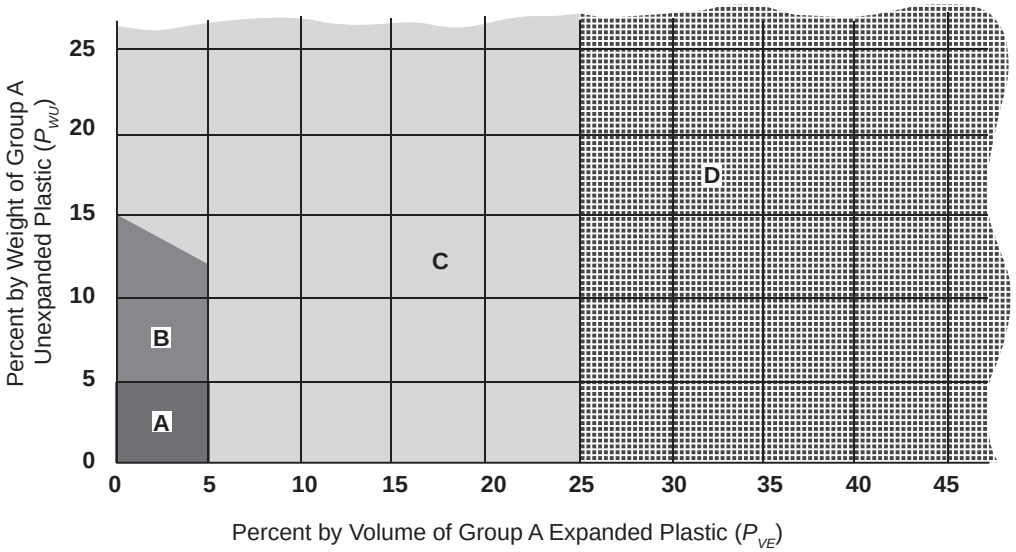
FIGURE 3203.9(1)—EVALUATION OF CARTONED COMMODITIES CONTAINING GROUP A PLASTICS[a, b]



A = Class I, II or III commodity
B = Class IV commodity
C = High-hazard commodity (Group A Unexpanded)
D = High-hazard commodity (Group A Expanded)

a. This figure is used to determine the commodity classification of a mixed commodity with Group A plastics in a package, carton or crate.
b. The following is an example of how to apply Figure 3203.9(1): A pallet load consists of a Class III commodity in cardboard boxes with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5 percent. Using Equation 32-2, the volume of expanded Group A plastic is 15 percent. This commodity is classified as a Class IV commodity. If the volume of the expanded Group A plastic is increased to 20 percent, the classification changes to a high-hazard (Group A unexpanded) commodity. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.

FIGURE 3203.9(2)—EVALUATION OF EXPOSED COMMODITIES CONTAINING GROUP A PLASTICS[a, b]



A = Class I, II or III commodity
B = Class IV commodity
C = High-hazard commodity (Group A Unexpanded)
D = High-hazard commodity (Group A Expanded)

a. This figure is used to determine the commodity classification of a mixed commodity with Group A plastics where the products are exposed.
b. The following is an example of how to apply Figure 3203.9(2): A pallet load consists of an exposed Class III commodity with components of unexpanded Group A plastic and packing material of expanded Group A plastic. Using Equation 32-1, the weight of unexpanded Group A plastic is 5 percent. Using Equation 32-2, the volume of expanded Group A plastic is 6 percent. This commodity is classified as a high-hazard (Group A unexpanded) commodity. Where the load is stored on a plastic pallet, the requirements in Section 3203.10 also apply.

3203.9.1 Classifying mixed commodities with limited Group A plastics. The percentage of Group A plastics determined in accordance with Section 3203.9.2 shall be used in Figures 3203.9(1) and 3203.9(2). Results from Figure 3203.9(1) must be compared to results from Figure 3203.9(2) and the commodity will be classified with the highest commodity classification.

Figures 3203.9(1) and 3203.9(2) shall not be used to reduce the commodity classification shown in Table 3203.8.

3203.9.2 Percentage of Group A plastics. The pallet, if any, shall not be included when measuring the weight of the commodity (W_{PU} or W_{PE}) or the volume of the commodity (V_{PE}). The pallet, if any, shall be included when measuring the weight of the entire load (W_L) or the volume of the entire load (V_L).

Exception: Where noncombustible pallets are used, the pallets shall not be included in the volume and weight calculations.

The percentage by weight of Group A unexpanded plastics in the load shall be calculated in accordance with Equation 32-1.

The percentage by volume of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-2.

The percentage by weight of Group A expanded plastics in the load shall be calculated in accordance with Equation 32-3.

Equation-32-1 $P_{WU} = W_{PU} / W_L$

where:

P_{WU} = Percentage by weight of Group A unexpanded plastic.

W_{PU} = Weight of Group A unexpanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, including the weight of the pallet, if any.

Equation 32-2 $P_{VE} = V_{PE} / V_L$

where:

P_{VE} = Percentage by volume of Group A expanded plastic.

V_{PE} = Volume of Group A expanded plastic in the commodity, not including the volume of the pallet, if any.

V_L = Volume of the entire load, including the volume of the pallet, if any.

Equation 32-3 $P_{WE} = W_P \mathrm{E} / W_L$

where:

P_{WE} = Percentage by weight of Group A expanded plastic.

W_{PE} = Weight of Group A expanded plastic in the commodity, not including the weight of the pallet, if any.

W_L = Weight of the entire load, including the weight of the pallet, if any.

3203.10 Plastic pallets. The commodity classification determined in Section 3203.8 or 3203.9 shall be modified in accordance with Sections 3203.10.1 through 3203.10.3 where plastic pallets are used.

Exception: The commodity classification is not modified where any of the following conditions occur:

1. Group A plastic commodities are stored on plastic pallets.
2. Sprinkler protection consists of sprinklers at the ceiling only, using sprinklers with a minimum K-factor of K-16.8 (240).
3. The plastic pallets are listed and labeled in accordance with Section 3206.4.1.1.

3203.10.1 Unreinforced plastic pallets. For Class I through IV commodities, where unreinforced polypropylene or unreinforced high-density polyethylene plastic pallets are used, the commodity classification shall be increased one class. To be considered unreinforced plastic pallets, the pallets shall be marked with a permanent symbol indicating the pallet is unreinforced.

3203.10.2 Reinforced plastic pallets. For Class I through IV commodities, where reinforced polypropylene or reinforced high-density polyethylene plastic pallets are used, the commodity classification shall be increased two classes except for Class IV commodities, which shall be increased to a high-hazard (Group A plastic, cartoned, unexpanded) commodity.

3203.10.3 Other pallets. For Class I through IV commodities stored on plastic pallets other than polypropylene or high-density polyethylene plastic pallets, the commodity classification shall be increased two classes unless specific testing is conducted by a testing laboratory.

SECTION 3204—DESIGNATION OF HIGH-PILED STORAGE AREAS

3204.1 General. High-piled storage areas, and portions of high-piled storage areas intended for storage of a different commodity class than adjacent areas, shall be designed and specifically designated to contain Class I, Class II, Class III, Class IV or high-hazard commodities. The designation of a high-piled storage area, or portion thereof intended for storage of a different commodity class, shall be based on the highest hazard commodity class stored except as provided in Section 3204.2.

3204.2 Designation based on engineering analysis. The designation of a high-piled combustible storage area, or portion thereof, is allowed to be based on a lower hazard class than that of the highest class of commodity stored where a limited quantity of the higher hazard commodity has been demonstrated by engineering analysis to be adequately protected by the automatic sprinkler system provided. The engineering analysis shall consider the ability of the automatic sprinkler system to deliver the higher density required by the higher hazard commodity. The higher density shall be based on the actual storage height of the pile or rack and the minimum allowable design area for sprinkler operation as set forth in the density/area figures provided in NFPA 13. The contiguous area occupied by the higher hazard commodity shall not exceed 120 square feet (11 m^2) and additional areas of higher hazard commodity shall be separated from other such areas by 25 feet (7620 mm) or more. The automatic sprinkler system shall be capable of delivering the higher density over a minimum area of 900 square feet (84 m^2) for wet pipe systems and 1,200 square feet (111 m^2) for dry pipe systems. The shape of the design area shall be in accordance with Section 903.

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SECTION 3205—HOUSEKEEPING AND MAINTENANCE

3205.1 Storage layout plan maintenance. The approved storage layout shall be verified and evaluated annually in accordance with Section 3201.3.2. Modifications or changes to the provisions of the approved storage layout shall not be made without the prior approval of the fire code official.

3205.2 Rack structures. The structural integrity of racks shall be maintained.

3205.3 Ignition sources. Clearance from ignition sources shall be provided in accordance with Section 305.

3205.4 Smoking. Smoking shall be prohibited. Approved "No Smoking" signs shall be conspicuously posted in accordance with Section 310.

3205.5 Aisle maintenance. When restocking is not being conducted, aisles shall be kept clear of storage, waste material and debris. Fire department access doors, aisles and exit doors shall not be obstructed. During restocking operations using manual stocking methods, a minimum unobstructed aisle width of 24 inches (610 mm) shall be maintained in 48-inch (1219 mm) or smaller aisles, and a minimum unobstructed aisle width of one-half of the required aisle width shall be maintained in aisles greater than 48 inches (1219 mm). During mechanical stocking operations, a minimum unobstructed aisle width of 44 inches (1118 mm) shall be maintained in accordance with Section 3206.10.

Exception: In high-piled single- and double-row rack storage of combustible materials protected by automatic sprinkler systems designed and installed in accordance with the requirements of NFPA 13 governing the use of K-25.2 (360) sprinklers, displays and wing stacks not exceeding 48 inches (1219 mm) in height provided that they do not obstruct or reduce the clear width of the aisle to less than 48 inches (1219 mm).

3205.6 Pile dimension and height limitations. Pile dimensions and height limitations shall comply with Section 3207.3.

3205.7 Designation of storage heights. Where required by the fire code official, a visual method of indicating the maximum allowable storage height shall be provided.

3205.8 Arrays. Arrays shall comply with Section 3207.4.

3205.9 Flue spaces. Flue spaces shall comply with Section 3208.3.

SECTION 3206—GENERAL FIRE PROTECTION AND LIFE SAFETY FEATURES

3206.1 General. Fire protection and life safety features for high-piled storage areas shall be in accordance with Sections 3206.2 through 3206.11.

3206.2 Type of protection. Where required by Table 3206.2, fire detection systems, smoke and heat removal and automatic sprinkler design densities shall be provided to protect the high-piled storage area.

TABLE 3206.2—GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 3206.2 and 3206.3)	ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)[b]				SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)		
		Automatic fire-extinguishing system (see Section 3206.4)	Fire detection system (see Section 3206.5)	Fire department access doors (see Section 3206.7)	Smoke and heat removal (see Section 3206.8)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
I–IV	0–500	Not Required[a]	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required
	501–2,500	Not Required[a]	Yes[g]	Not Required	Not Required	120	40	100,000
	2,501–12,000 Open to the public	Yes	Not Required	Not Required	Not Required	120	40	400,000
I–IV—contifnued	2,501–12,000 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	120	40	400,000
	2,501–12,000 Not open to the public (Option 2)	Not Required[a]	Yes	Yes	Yes[h, i]	120	30[e]	200,000
	12,001–500,000	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000
	Greater than 500,000[f]	Yes	Not Required	Yes	Yes[h, i]	120	40	400,000

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TABLE 3206.2—GENERAL FIRE PROTECTION AND LIFE SAFETY REQUIREMENTS—continued

COMMODITY CLASS	SIZE OF HIGH-PILED STORAGE AREA[a] (square feet) (see Sections 3206.2 and 3206.3)	ALL STORAGE AREAS (see Sections 3206, 3207 and 3208)[b]				SOLID-PILED STORAGE, SHELF STORAGE AND PALLETIZED STORAGE (see Section 3207.3)		
		Automatic fire-extinguishing system (see Section 3206.4)	Fire detection system (see Section 3206.5)	Fire department access doors (see Section 3206.7)	Smoke and heat removal (see Section 3206.8)	Maximum pile dimension[c] (feet)	Maximum permissible storage height[d] (feet)	Maximum pile volume (cubic feet)
High hazard	0–500	Not Required[a]	Not Required	Not Required	Not Required	60	Not Required	Not Required
	501–2,500 Open to the public	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 1)	Yes	Not Required	Not Required	Not Required	60	30	75,000
	501–2,500 Not open to the public (Option 2)	Not Required[a]	Yes[g]	Yes	Yes[h, i]	60	20	50,000
	2,501–300,000	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000
	Greater than 300,000[f]	Yes	Not Required	Yes	Yes[h, i]	60	30	75,000

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3, 1 square foot = 0.0929 m^2.

a. Where automatic sprinklers are required for reasons other than those in Chapter 32, the portion of the sprinkler system protecting the high-piled storage area shall be designed and installed in accordance with Sections 3207 and 3208.

b. For aisles, see Section 3206.10.

c. Piles shall be separated by aisles complying with Section 3206.10.

d. For storage in excess of the height indicated, special fire protection shall be provided in accordance with Note f where required by the fire code official. See Chapters 51 and 57 for special limitations for aerosols and flammable and combustible liquids, respectively.

e. For storage exceeding 30 feet in height, Option 1 shall be used.

f. Special fire protection provisions including, but not limited to, fire protection of exposed steel columns; increased sprinkler density; additional in-rack sprinklers, without associated reductions in ceiling sprinkler density; or fire department hose connections shall be provided where required by the fire code official.

g. Not required where an automatic fire-extinguishing system is designed and installed to protect the high-piled storage area in accordance with Sections 3207 and 3208.

h. Not required where storage areas *with an exit access travel distance of 250 feet (76 200 mm) or less* are protected by either early suppression fast response (ESFR) sprinkler systems or control mode special application sprinklers with a response time index of 50 (meters-seconds)$^{1/2}$ or less that are listed to control a fire in the stored commodities with 12 or fewer sprinklers, installed in accordance with *Section 903.3.1.1.*

i. Not required in frozen food warehouses used solely for storage of Class I and II commodities where protected by an approved automatic sprinkler system.

3206.2.1 Extent of protection. The fire safety features required in Table 3206.2 shall extend to the lesser of 15 feet (4572 mm) beyond the high-piled storage area or a full height wall. Where portions of high-piled storage areas have different fire protection requirements because of commodity, method of storage or storage height, the fire protection features required by Table 3206.2 within this area shall be based on the most restrictive design requirements.

3206.3 High-piled storage areas. For the application of Table 3206.2, the size of the high-piled storage areas shall be determined in accordance with Sections 3206.3.1 through 3206.3.2.1.

3206.3.1 Size of high-piled storage area. The size of each high-piled storage area shall include the footprint of the actual high-piled storage racks, shelves or piles and the following aisles:

1. Interior aisles within the footprint of the storage area.
2. An aisle around the perimeter of the footprint with a minimum width as required in Section 3206.10.1 or the dimension to a full height wall, whichever is less.

3206.3.2 Multiple high-piled storage areas. Where a building contains multiple high-piled storage areas, the aggregate of all high-piled storage areas shall be used for the application of Table 3206.2 unless the high-piled storage areas are separated in accordance with one of the following:

1. High-piled storage areas separated by fire barriers with a minimum fire-resistance-rating of 1 hour constructed in accordance with Section 707 of the *California Building Code*.
2. In buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, high-piled storage areas separated by 100 feet (30 480 mm) or more. The area providing the separation shall not contain high-piled combustible storage.

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3206.3.2.1 Multiple class high-piled storage areas. High-piled storage areas classified as Class I through IV not separated from high-piled storage areas classified as high hazard shall utilize the aggregate of all high-piled storage areas as high hazard for the purposes of the application of Table 3206.2. Multiple class high-piled storage areas meeting the separation requirements in Section 3206.3.2 shall be considered as separated. The fire safety features in Table 3206.2 shall be extended beyond the higher-hazard storage area in accordance with Section 3206.2.1.

Exception: Multiple class high-piled storage areas do not need to be separated where in accordance with Section 3204.2.

3206.4 Automatic sprinklers. Automatic sprinkler systems shall be provided in accordance with Sections 3207, 3208 and 3209.

3206.4.1 Pallets. Automatic sprinkler system requirements based on the presence of pallets shall be in accordance with NFPA 13.

3206.4.1.1 Plastic pallets. Plastic pallets listed and labeled in accordance with FM 4996 or UL 2335 shall be treated as wood pallets for determining required sprinkler protection.

3206.5 Fire detection. Where fire detection is required by Table 3206.2, an approved automatic fire detection system shall be installed throughout the high-piled storage area. The system shall be monitored and be in accordance with Section 907.

3206.6 Building access. Fire apparatus access roads in accordance with Section 503 shall be provided within 150 feet (45 720 mm) of all portions of the exterior walls of buildings used for high-piled storage.

Exception: Where fire apparatus access roads cannot be installed because of topography, railways, waterways, nonnegotiable grades or other similar conditions, the fire code official is authorized to require additional fire protection.

3206.7 Fire department access doors. Where fire department access doors are required by Table 3206.2, fire department access doors shall be provided in accordance Sections 3206.7.1 through 3206.7.8.

3206.7.1 Exterior walls without fire department access doors. Fire department access doors are not required in an exterior wall that does not face a fire apparatus access road provided that all of the following conditions occur:

1. The opposite exterior wall faces a fire apparatus access road.
2. The opposite exterior wall is provided with fire department access doors.
3. The entire interior surface of the exterior wall is less than 150 feet (45 720 mm) away from a fire department access door.
4. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

3206.7.2 Where located. Where exterior walls surrounding high-piled storage areas face fire apparatus access roads, such walls shall be provided with fire department access doors.

3206.7.3 Access to doors. Fire department access doors shall be able to be accessed without the use of a ladder.

3206.7.4 Marking on fire department access doors. Fire department access doors shall be labeled on the exterior side with the following sign or other approved sign:

FIRE DEPARTMENT ACCESS DOOR
DO NOT BLOCK

The lettering shall be in a contrasting color to the background. Letters shall have a minimum height of 2 inches (51 mm) with a minimum stroke of $^3/_8$ inch (10 mm).

3206.7.5 Number of doors required. The required fire department access doors shall be distributed such that the lineal distance between adjacent fire department access doors does not exceed 125 feet (38 100 mm) measured center to center.

Exception: The linear distance between adjacent access doors shall not exceed 200 feet (60 960 mm) in existing buildings where change in occupancy is not proposed.

3206.7.6 Door size and type. Fire department access doors shall be not less than 3 feet (914 mm) in width and 6 feet 8 inches (2032 mm) in height. Roll-up doors shall not be considered fire department access doors unless approved.

3206.7.7 Locking devices. Locking devices on fire department access doors shall be approved.

3206.7.8 Key box. Where fire department access doors are required, a key box shall be installed in accordance with Section 506.1. The key box shall contain keys or devices to allow for entry through the fire department access doors.

3206.8 Smoke and heat removal. Where smoke and heat removal is required by Table 3206.2 it shall be provided in accordance with Section 910.

3206.9 Fire department hose connections. Where exit passageways are required by the *California Building Code* for egress, a Class I standpipe system shall be provided in accordance with Section 905.

3206.10 Aisles. Aisles providing access to exits and fire department access doors shall be provided in high-piled storage areas exceeding 500 square feet (46 m^2), in accordance with Sections 3206.10.1 through 3206.10.3. Aisles separating storage piles or racks shall comply with NFPA 13. Aisles shall comply with Chapter 10.

Exception: Where aisles are precluded by rack storage systems, alternate methods of access and protection are allowed where approved.

3206.10.1 Width. Aisle width shall be in accordance with Sections 3206.10.1.1 and 3206.10.1.2.

Exceptions:

1. Aisles crossing rack structures or storage piles, that are used only for employee access, shall be not less than 24 inches (610 mm) wide.

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2. Aisles separating shelves classified as shelf storage shall be not less than 30 inches (762 mm) wide.

3206.10.1.1 Sprinklered buildings. Aisles in sprinklered buildings shall be not less than 44 inches (1118 mm) wide. Aisles shall be not less than 96 inches (2438 mm) wide in high-piled storage areas exceeding 2,500 square feet (232 m^2) in area, that are open to the public and designated to contain high-hazard commodities.

Aisles shall be not less than 96 inches (2438 mm) wide in areas open to the public where mechanical stocking methods are used.

Exceptions:

1. Aisles in high-piled storage areas exceeding 2,500 square feet (232 m^2) in area, that are open to the public and designated to contain high-hazard commodities, and that are protected by an automatic sprinkler system designed for multiple-row racks of high-hazard commodities, shall be not less than 44 inches (1118 mm) wide.
2. Aisles that are in high-piled storage areas exceeding 2,500 square feet (232 m^2) in area, not open to the public and protected by an automatic sprinkler system designed for multiple-row racks, shall be not less than 24 inches (610 mm) wide.

3206.10.1.2 Nonsprinklered buildings. Aisles in nonsprinklered buildings shall be not less than 96 inches (2438 mm) wide.

3206.10.2 Clear height. The required aisle width shall extend from floor to ceiling. Rack structural supports and catwalks are allowed to cross aisles at a minimum height of 6 feet 8 inches (2032 mm) above the finished floor level, provided that such supports do not interfere with fire department hose stream trajectory.

3206.10.3 Dead-end aisles. Dead-end aisles shall not exceed 20 feet (6096 mm) in length in Group M occupancies. Dead-end aisles shall not exceed 50 feet (15 240 mm) in length in all other occupancies.

Exception: Dead-end aisles are not limited where the length of the dead-end aisle is less than 2.5 times the least width of the dead-end aisle.

3206.11 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with Section 906.

SECTION 3207—SOLID-PILED AND SHELF STORAGE

3207.1 General. Shelf storage and storage in solid piles, solid piles on pallets and bin box storage in bin boxes not exceeding 5 feet (1524 mm) in any dimension, shall be in accordance with Section 3206 and this section.

3207.2 Fire protection. Where automatic sprinklers are required by Table 3206.2, an approved automatic sprinkler system shall be installed throughout the building or to 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code*. Openings in such fire barriers shall be protected by opening protectives having a 1-hour fire protection rating. The design and installation of the automatic sprinkler system and other applicable fire protection shall be in accordance with the *California Building Code* and NFPA 13.

3207.2.1 Shelf storage. Shelf storage greater than 12 feet (3658 mm) but less than 15 feet (4572 mm) in height shall be in accordance with the fire protection requirements set forth in NFPA 13. Shelf storage 15 feet (4572 mm) or more in height shall be protected in an approved manner with special fire protection, such as in-rack sprinklers.

3207.3 Pile dimension and height limitations. Pile dimensions, the maximum permissible storage height and pile volume shall be in accordance with Table 3206.2.

3207.4 Arrays. Where an automatic sprinkler system design utilizes protection based on a closed array, array clearances shall be provided and maintained as specified by the standard used.

SECTION 3208—RACK STORAGE

3208.1 General. Rack storage shall be in accordance with Section 3206 and this section. Bin boxes exceeding 5 feet (1524 mm) in any dimension shall be regulated as rack storage.

3208.1.1 Storage racks. The design and installation of storage racks shall be in accordance with the *California Building Code*.

3208.2 Fire protection. Where automatic sprinklers are required by Table 3206.2, an approved automatic sprinkler system shall be installed throughout the building or to 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code*. Openings in such fire barriers shall be protected by opening protectives having a 1-hour fire protection rating. The design and installation of the automatic sprinkler system and other applicable fire protection shall be in accordance with Section 903.3.1.1 and the *California Building Code*.

3208.2.1 Plastic shelves. Storage on plastic shelves shall be protected by approved specially engineered fire protection systems.

3208.2.2 Racks with solid shelving. Racks with solid shelving having an area greater than 20 square feet (1.9 m^2), measured between approved flue spaces at all four edges of the shelf, shall be in accordance with this section.

Exceptions:

1. Racks with mesh, grated, slatted or similar shelves having uniform openings not more than 6 inches (152 mm) apart, comprising not less than 50 percent of the overall shelf area, and with approved flue spaces are allowed to be treated as racks without solid shelves.
2. Racks used for the storage of combustible paper records, with solid shelving, shall be in accordance with NFPA 13.

3208.2.2.1 Fire protection. Fire protection for racks with solid shelving shall be in accordance with NFPA 13.

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3208.3 Flue spaces. Rack storage areas protected with an automatic sprinkler system shall be provided with flue spaces in accordance with Table 3208.3. The space taken up by rack uprights that is not obstructed by commodities or solid shelving is allowed to be included in the transverse flue space measurement. Required flue spaces shall be maintained.

TABLE 3208.3—REQUIRED FLUE SPACES FOR RACK STORAGE

RACK CONFIGURATION	FLUE DESIGN		AUTOMATIC SPRINKLER PROTECTION		
			Sprinklers at the ceiling with or without minimum in-rack sprinklers		In-rack sprinklers at every tier
			Storage height ≤ 25 feet	Storage height > 25 feet	Any height
Single-row rack	Transverse flue space	Size[b]	3 inches	3 inches	Not required
		Vertically aligned	Not required	Yes	Not required
	Longitudinal flue space		Not required	Not required	Not required
Double-row rack (Option 1)	Transverse flue space	Size[b]	6 inches[a]	3 inches	Not required
		Vertically aligned	Not required	Yes	Not required
	Longitudinal flue space		Not required	6 inches	Not required
Double-row rack (Option 2)	Transverse flue space	Size[b]	3 inches	6 inches	Not required
		Vertically aligned	Not required	Yes	Not required
	Longitudinal flue space		6 inches	Not required	Not required
Multiple-row rack	Transverse flue space	Size[b]	6 inches	6 inches	Not required
		Vertically aligned	Not required	Yes	Not required
	Longitudinal flue space		Not required	Not required	Not required

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Three-inch transverse flue spaces shall be provided not less than every 10 feet where ESFR sprinkler protection is provided.

b. Random variations are allowed, provided that the configuration does not obstruct water penetration.

3208.3.1 Flue space protection. Flue spaces required by Table 3208.3 above the first tier of storage in single-, double- or multiple-row rack storage installations shall, where required by the fire code official, be equipped with approved protection devices. Such devices shall not be removed or modified.

3208.4 Column protection. Steel building columns shall be protected in accordance with NFPA 13.

3208.5 Extra-high-rack storage systems. Approval of the fire code official shall be obtained prior to installing extra-high-rack combustible storage.

3208.5.1 Fire protection. Buildings with extra-high-rack combustible storage shall be protected with a specially engineered automatic sprinkler system. Extra-high-rack combustible storage shall be provided with additional special fire protection, such as separation from other buildings and additional built-in fire protection features and fire department access, where required by the fire code official.

SECTION 3209—AUTOMATED STORAGE

3209.1 General. Automated storage shall be in accordance with this section.

3209.2 Automatic sprinklers. Where automatic sprinklers are required by Table 3206.2, the building shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

3209.3 Carousel storage. High-piled storage areas having greater than 500 square feet (46 m^2) of carousel storage shall be provided with automatic shutdown in accordance with one of the following:

1. An automatic smoke detection system installed in accordance with Section 907, with coverage extending 15 feet (4575 mm) in all directions beyond unenclosed carousel storage systems and that sounds a local alarm at the operator's station and stops the carousel storage system upon the activation of a single detector.
2. An automatic smoke detection system installed in accordance with Section 907 and within enclosed carousel storage systems, that sounds a local alarm at the operator's station and stops the carousel storage system upon the activation of a single detector.
3. A single dead-man-type control switch that allows the operation of the carousel storage system only when the operator is present. The switch shall be in the same room as the carousel storage system and located to provide for observation of the carousel system.

3209.4 Automated rack storage. High-piled storage areas with automated rack storage shall be provided with a manually activated emergency shutdown switch and automatic shutdown in accordance with Sections 3209.4.1 and 3209.4.2.

3209.4.1 Manual activated shutdown. A manually activated switch shall be provided to initiate the approved automatic shutdown process. The switch shall be clearly identified and shall be in a location approved by the fire code official.

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3209.4.2 Automatic shutdown. Automatic shutdown shall be required for high-piled combustible storage areas greater than 500 square feet (46 m^2). The approved automatic shutdown process shall commence upon any of the following events:

1. Water flow is detected in the automatic sprinkler system, if present.
2. Activation of the fire detection system, if present.

SECTION 3210—SPECIALTY STORAGE

3210.1 General. Records storage facilities used for the rack or shelf storage of combustible paper records greater than 12 feet (3658 mm) in height shall be in accordance with Sections 3206 and 3208. Palletized storage of records shall be in accordance with Section 3207.

3210.1.1 Alternative fire protection. The design and installation of automatic fire-extinguishing systems in archives, vaults and record storage rooms shall be in accordance with NFPA 232.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 33 – FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
3311.2			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
33
FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION

User notes:

About this chapter: Chapter 33 outlines general fire safety precautions for all structures and all occupancies during construction and demolition operations. In general, these requirements seek to maintain required levels of fire protection, limit fire spread, establish the appropriate operation of equipment and promote prompt response to fire emergencies. There is an emphasis on owner responsibility and the need to create and implement a site safety plan. Features regulated include fire protection systems, firefighter access to the site and building, water supply, means of egress, hazardous materials storage and use, and temporary heating equipment and other ignition sources. Fire watches are an important component of this chapter. This chapter correlates with Chapter 33 of the *California Building Code*.

SECTION 3301—GENERAL

3301.1 Scope. This chapter shall apply to structures in the course of construction, alteration or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

3301.2 Purpose. This chapter prescribes minimum safeguards for construction, alteration and demolition operations to provide reasonable safety to life and property from fire during such operations.

SECTION 3302—DEFINITIONS

3302.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 3303—ADMINISTRATIVE SAFETY CONTROLS

3303.1 Program development and maintenance. The owner or owner's authorized agent shall be responsible for the development, implementation and maintenance of an approved, written site safety plan establishing a fire prevention program at the project site applicable throughout all phases of the construction, repair, alteration or demolition work. The plan addresses the requirements of this chapter and other applicable portions of this code, the duties of staff and staff training requirements. The plan shall be submitted and approved before a building permit is issued. Any changes to the plan shall be submitted for approval.

3303.1.1 Components of site safety plans. Site safety plans shall include the following as applicable:

1. Name and contact information of site safety director.
2. Documentation of the training of the site safety director and fire watch personnel.
3. Procedures for reporting emergencies.
4. Fire department vehicle access routes.
5. Location of fire protection equipment, including portable fire extinguishers, standpipes, fire department connections and fire hydrants.
6. Smoking and cooking policies, designated areas to be used where approved, and signage locations in accordance with Section 3305.7.
7. Location and safety considerations for temporary heating equipment.
8. Hot work permit plan.
9. Plans for control of combustible waste material.
10. Locations and methods for storage and use of flammable and combustible liquids and other hazardous materials.
11. Provisions for site security and where required, for a fire watch.
12. Changes that affect this plan.
13. Other site-specific information required by the fire code official.

3303.2 Site safety director. The owner shall designate a person to be the site safety director. The site safety director shall be responsible for ensuring compliance with the site safety plan. The site safety director shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided in accordance with NFPA 241, the site safety director shall be responsible for the guard service.

3303.2.1 Training. Training of fire watch and other responsible personnel in the use of fire protection equipment shall be the responsibility of the site safety director. Records of training shall be kept and made a part of the written plan for the site safety plan.

3303.3 Daily fire safety inspection. The site safety director shall be responsible for completion of a daily fire safety inspection at the project site. Each day, all building and outdoor areas shall be inspected to ensure compliance with the inspection list in this section.

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The results of each inspection shall be documented and maintained on-site until a certificate of occupancy has been issued. Documentation shall be immediately available on-site for presentation to the fire code official upon request.

1. Any contractors entering the site to perform hot work each day have been instructed in the hot work safety requirements in Chapter 35, and hot work is performed only in areas approved by the site safety director.
2. Temporary heating equipment is maintained away from combustible materials in accordance with the equipment manufacturer's instructions.
3. Combustible debris, rubbish and waste material is removed from the building in areas where work is not being performed.
4. Temporary wiring does not have exposed conductors.
5. Flammable liquids and other hazardous materials are stored in locations that have been approved by the site safety director when not involved in work that is being performed.
6. Fire apparatus access roads required by Section 3311 are maintained clear of obstructions that reduce the width of the usable roadway to less than 20 feet (6096 mm).
7. Fire hydrants are clearly visible from access roads and are not obstructed.
8. The location of fire department connections to standpipe and in-service automatic sprinkler systems are clearly identifiable from the access road and such connections are not obstructed.
9. Standpipe systems are in service and continuous to the highest work floor, as specified in Section 3307.2.
10. Portable fire extinguishers are available in locations required by Sections 3305.10.2 and 3306.6.
11. Where a fire watch is required in accordance with Section 3303.5, fire watch records required by that section are up-to-date.

3303.3.1 Violations. Failure to properly conduct, document and maintain documentation required by this section shall constitute an unlawful act in accordance with Section 113.1 and shall result in the issuance of a notice of violation to the site safety director in accordance with Section 113.3. Upon the third offense, the fire code official is authorized to issue a stop work order in accordance with Section 114, and work shall not resume until satisfactory assurances of future compliance have been presented to and approved by the fire code official.

3303.4 Qualifications. Site safety directors shall acquire training specific to their roles and responsibilities. Upon request, the training and qualifications of the site safety director shall be submitted to the fire code official for approval.

3303.5 Fire watch. Where required by the fire code official or the site safety plan established in accordance with Section 3303.1, a fire watch shall be provided for building demolition and for building construction.

3303.5.1 Fire watch during construction. A fire watch shall be provided during nonworking hours for new construction that exceeds 40 feet (12 192 mm) in height above the lowest adjacent grade at any point along the building perimeter, for new multistory construction with an aggregate area exceeding 50,000 square feet (4645 m^2) per story or as required by the fire code official.

3303.5.2 Fire watch personnel. Fire watch personnel shall be provided in accordance with this section.

3303.5.2.1 Duties. The primary duty of fire watch personnel shall be to perform constant patrols and watch for the occurrence of fire. The combination of fire watch duties and site security duties is acceptable.

3303.5.2.2 Training. Personnel shall be trained to serve as an on-site fire watch. Training shall include the use of portable fire extinguishers. Fire extinguishers and fire reporting shall be in accordance with Section 3303.6.

3303.5.2.3 Means of notification. Fire watch personnel shall be provided with not fewer than one approved means for notifying the fire department.

3303.5.3 Fire watch location and records. The fire watch shall include areas specified by the site safety plan established in accordance with Section 3303.

3303.5.4 Fire watch records. Fire watch personnel shall keep a record of all time periods of duty, including the log entry for each time the site was patrolled and each time a structure was entered and inspected. Records shall be made available for review by the fire code official upon request.

3303.6 Emergency telephone. Emergency telephone facilities with ready access shall be provided in an approved location at the construction site, or an approved equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone. Alternatively, where an equivalent means of communication has been approved, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks and in the construction site office.

SECTION 3304—PROTECTION OF COMBUSTIBLE MATERIALS

3304.1 Combustible debris, rubbish and waste. Combustible debris, rubbish and waste material shall comply with the requirements of Sections 3304.1.1 through 3304.2.

3304.1.1 Combustible waste material accumulation. Combustible debris, rubbish and waste material shall not be accumulated within buildings.

3304.1.2 Combustible waste material removal. Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.

3304.1.3 Rubbish containers. Where rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) (0.15 m^3) are used for temporary storage of combustible debris, rubbish and waste material, they shall have tight-fitting or self-closing lids. Such rubbish containers shall be constructed entirely of materials that comply with either of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

3304.2 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.

SECTION 3305—IGNITION SOURCE CONTROLS

3305.1 Listed. Temporary heating devices shall be listed and labeled. The installation, maintenance and use of temporary heating devices shall be in accordance with the listing and the manufacturer's instructions.

3305.1.1 Oil-fired heaters. Oil-fired heaters shall comply with Section 605.

3305.1.2 LP-gas heaters. Fuel supplies for liquefied-petroleum gas-fired heaters shall comply with Chapter 61 and the *International Fuel Gas Code*.

3305.1.3 Refueling. Refueling operations for liquid-fueled equipment or appliances shall be conducted in accordance with Section 5705. The equipment or appliance shall be allowed to cool prior to refueling.

3305.1.4 Installation. Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer's instructions.

3305.1.5 Supervision. The use of temporary heating devices shall be supervised and maintained only by competent personnel.

3305.2 Smoking. Smoking shall be prohibited except in approved areas. Signs shall be posted in accordance with Section 310. In approved areas where smoking is permitted, approved ashtrays shall be provided in accordance with Section 310.

3305.3 Burning of combustible debris, rubbish and waste. Combustible debris, rubbish and waste material shall not be disposed of by burning on the site unless approved.

3305.4 Open burning. Open burning shall comply with Section 307.

3305.5 Cutting and welding. Welding, cutting, open torches and other hot work operations and equipment shall comply with Chapter 35.

3305.6 Electrical. Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration or demolition of buildings, structures, equipment or similar activities shall comply with *the California Electrical Code*.

3305.7 Cooking. Cooking shall be prohibited except in approved designated cooking areas separated from combustible materials by a minimum of 10 feet (3048 mm). Signs with a minimum letter height of 3 inches (76 mm) and a minimum brush stroke of $^1/_2$ inch (13 mm) shall be posted in conspicuous locations in designated cooking areas and state:

DESIGNATED COOKING AREA
COOKING OUTSIDE OF A DESIGNATED
COOKING AREA IS PROHIBITED

3305.8 Portable generators. Portable generators used at construction and demolition sites shall comply with Section 1204.

3305.9 Hot work operations. The site safety director shall ensure hot work operations and permit procedures are in accordance with Chapter 35.

3305.10 Safeguarding roofing operations. Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 3305.10.1 and 3305.10.2 and Chapter 35.

3305.10.1 Asphalt and tar kettles. Asphalt and tar kettles shall be operated in accordance with Section 303.

3305.10.2 Fire extinguishers for roofing operations. Fire extinguishers shall comply with Section 906. There shall be not less than one multiple-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

SECTION 3306—FIRE PROTECTION SYSTEMS AND DEVICES

3306.1 Fire protection devices. The site safety director shall ensure that all fire protection equipment is maintained and serviced in accordance with this code. Fire protection equipment shall be inspected in accordance with the fire protection program.

3306.2 Impairment of fire protection systems. The site safety director shall ensure impairments to any fire protection system are in accordance with Section 901.

3306.3 Smoke detectors and smoke alarms. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed. Smoke detectors and alarms that were removed shall be replaced upon conclusion of dust-producing work. Smoke detectors and smoke alarms that were covered shall be inspected and cleaned, as necessary, upon conclusion of dust-producing work.

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3306.4 Temporary covering of fire protection devices. Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

3306.5 Automatic sprinkler system. In buildings where an automatic sprinkler system is required by this code or the *California Building Code*, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved, except as provided in Section 105.3.4.

3306.5.1 Operation of valves. Operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. Where the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

3306.6 Portable fire extinguishers. Structures under construction, alteration or demolition shall be provided with not less than one approved portable fire extinguisher in accordance with Section 906 and sized for not less than ordinary hazard as follows:

1. At each stairway on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed.
3. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.

SECTION 3307—FIRE DEPARTMENT SITE ACCESS AND WATER SUPPLY

3307.1 Required access. Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

3307.1.1 Key boxes. Key boxes shall be provided as required by Chapter 5.

[BE] 3307.1.2 Stairways required. Where building construction exceeds 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access, a temporary or permanent stairway shall be provided. As construction progresses, such stairway shall be extended to within one floor of the highest point of construction having secured decking or flooring.

3307.1.3 Maintenance. Required means of egress and required accessible means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building.

Exception: Approved temporary means of egress and accessible means of egress systems and facilities.

3307.2 Water supply for fire protection. An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible building materials arrive on the site, on commencement of vertical combustible construction and on installation of a standpipe system in buildings under construction, in accordance with Sections 3307.2.1 through 3307.4.

Exception: The fire code official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

3307.2.1 Combustible building materials. When combustible building materials of the building under construction are delivered to a site, a minimum fire flow of 500 gallons per minute (1893 L/m) shall be provided. The fire hydrant used to provide this fire-flow supply shall be within 500 feet (152 m) of the combustible building materials, as measured along an approved fire apparatus access lane. Where the site configuration is such that one fire hydrant cannot be located within 500 feet (152 m) of all combustible building materials, additional fire hydrants shall be required to provide coverage in accordance with this section.

3307.2.2 Vertical construction of Types III, IV and V construction. Prior to commencement of vertical construction of Type III, IV or V buildings that utilize any combustible building materials, the fire flow required by Sections 3307.2.2.1 through 3307.2.2.3 shall be provided, accompanied by fire hydrants in sufficient quantity to deliver the required fire flow and proper coverage.

3307.2.2.1 Fire separation up to 30 feet. Where a building of Type III, IV or V construction has a fire separation distance of less than 30 feet (9144 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide either a minimum of 500 gallons per minute (1893 L/m) or the entire fire flow required for the building when constructed, whichever is greater.

3307.2.2.2 Fire separation of 30 feet up to 60 feet. Where a building of Type III, IV or V construction has a fire separation distance of 30 feet (9144 mm) up to 60 feet (18 288 mm) from property lot lines, and an adjacent property has an existing structure or otherwise can be built on, the water supply shall provide a minimum of 500 gallons per minute (1893 L/m) or 50 percent of the fire flow required for the building when constructed, whichever is greater.

3307.2.2.3 Fire separation of 60 feet or greater. Where a building of Type III, IV or V construction has a fire separation of 60 feet (18 288 mm) or greater from a property lot line, a water supply of 500 gallons per minute (1893 L/m) shall be provided.

3307.3 Vertical construction, Type I and II construction. If combustible building materials are delivered to the construction site, water supply in accordance with Section 3307.2.1 shall be provided. Additional water supply for fire flow is not required prior to commencing vertical construction of Type I and II buildings.

3307.4 Standpipe supply. Regardless of the presence of combustible building materials, the construction type or the fire separation distance, where a standpipe is required in accordance with Section 3307.5, a water supply providing a minimum flow of 500 gallons

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per minute (1893 L/m) shall be provided. The fire hydrant used for this water supply shall be located within 100 feet (30 480 mm) of the fire department connection supplying the standpipe.

3307.5 Standpipes. In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed prior to construction exceeding 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipes shall be provided with fire department hose connections at locations adjacent to stairways complying with Section 3307.1.2. As construction progresses, such standpipes shall be extended to within one floor of the highest point of construction having secured decking or flooring.

3307.5.1 Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

3307.5.2 Detailed requirements. Standpipes shall be installed in accordance with the provisions of Section 905.

Exception: Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.

SECTION 3308—MOTORIZED CONSTRUCTION EQUIPMENT

3308.1 Conditions of use. Internal-combustion-powered construction equipment shall be used in accordance with all of the following conditions:

1. Equipment shall be located so that exhausts do not discharge against combustible material.
2. Exhausts shall be piped to the outside of the building.
3. Equipment shall not be refueled while in operation.
4. Fuel for equipment shall be stored in an approved area outside of the building.

SECTION 3309—HAZARDOUS MATERIALS

3309.1 Storage of flammable and combustible liquids. Storage of flammable and combustible liquids shall be in accordance with Section 5704.

3309.1.1 Class I and Class II liquids. The storage, use and handling of flammable and combustible liquids at construction sites shall be in accordance with Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

3309.1.2 Housekeeping. Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.

3309.1.3 Precautions against fire. Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in accordance with Section 310.

3309.1.4 Handling at point of final use. Class I and II liquids shall be kept in approved safety containers.

3309.1.5 Leakage and spills. Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

3309.2 Storage and handling. The storage, use and handling of flammable gases shall comply with Chapter 58.

3309.2.1 Cleaning with flammable gas. Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.

3309.2.2 Pipe cleaning and purging. The cleaning and purging of flammable gas piping systems, including cleaning new or existing piping systems, purging piping systems into service and purging piping systems out of service, shall comply with NFPA 56.

Exceptions:

1. Compressed gas piping systems other than fuel gas piping systems where in accordance with Chapter 53.
2. Piping systems regulated by the *International Fuel Gas Code*.
3. Liquefied petroleum gas systems in accordance with Chapter 61.
4. Cleaning and purging of refrigerant piping systems shall comply with the *California Mechanical Code*.

3309.3 Storage and handling. Explosive materials shall be stored, used and handled in accordance with Chapter 56.

3309.3.1 Supervision. Blasting operations shall be conducted in accordance with Chapter 56.

3309.3.2 Demolition using explosives. Approved fire hoses for use by demolition personnel shall be maintained at the demolition site wherever explosives are used for demolition. Such fire hoses shall be connected to an approved water supply and shall be capable of being brought to bear on post-detonation fires anywhere on the site of the demolition operation.

SECTION 3310—ADDITIONAL SAFEGUARDS FOR OCCUPIED BUILDINGS

3310.1 Storage. Combustible materials associated with construction, demolition, remodeling or alterations to an occupied structure shall not be stored in exits, enclosures for stairways and ramps, or exit access corridors serving an occupant load of 30 or more.

Exceptions:

1. Where the only occupants are construction workers.

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2. Combustible materials that are temporarily accumulated to support work being performed when workers are present.

SECTION 3311—ADDITIONAL SAFEGUARDS FOR TYPES I AND II CONSTRUCTION

3311.1 Separations between construction areas. Separations used in Type I and Type II construction to separate construction areas from occupied portions of the building shall be constructed of materials that comply with one of the following:

1. Noncombustible materials.
2. Materials that exhibit a flame spread index not exceeding 25 when tested in accordance with ASTM E84 or UL 723.
3. Materials exhibiting a peak heat release rate not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation on specimens at the thickness intended for use.

3311.2 Group I-2 separations. *For additional requirements for occupancies in Group I-2, see Sections 1105.12 and 1105.12.1.*

SECTION 3312—ADDITIONAL SAFEGUARDS FOR TYPE IV CONSTRUCTION

3312.1 Fire safety requirements for buildings of Types IV-A, IV-B and IV-C construction. Buildings of Types IV-A, IV-B and IV-C construction designed to be greater than six stories above grade plane shall comply with the following requirements during construction unless otherwise approved by the fire code official:

1. Standpipes shall be provided in accordance with Section 3307.5.
2. A water supply for fire department operations, as approved by the fire code official and the fire chief.
3. Where building construction exceeds six stories above grade plane and noncombustible protection is required by Section 602.4 of the *California Building Code*, at least one layer of noncombustible protection shall be installed on all building elements on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

   Exceptions:

   1. Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.
   2. Noncombustible material on the top of mass timber floor assemblies shall not be required before erecting additional floor levels.
4. Where building construction exceeds six stories above grade plane, required exterior wall coverings shall be installed on floor levels, including mezzanines, more than four levels below active mass timber construction before additional floor levels can be erected.

   Exception: Shafts and vertical exit enclosures shall not be considered part of the active mass timber construction.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 34 – TIRE REBUILDING AND TIRE STORAGE

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
3401.1			X																				
3404.2			X																				
3405.1			X																				
3405.4			X																				
3405.7			X																				
3405.8			X																				
3405.9			X																				
3406.1			X																				
3408.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

34

TIRE REBUILDING AND TIRE STORAGE

User notes:

About this chapter: Chapter 34 provides requirements that are intended to prevent or control fires and explosions associated with the remanufacture and storage of tires and tire byproducts. Additionally, the requirements are intended to minimize the impact of indoor and outdoor tire storage fires by regulating pile volume and location, segregating the various operations, providing for fire department access and a water supply, and controlling ignition sources.

SECTION 3401—GENERAL

3401.1 Scope. Tire rebuilding plants, tire storage *[including tire derived products as defined in Public Resources Code, Section 42805.7(a)]* and tire byproduct facilities shall comply with this chapter, other applicable requirements of this code and NFPA 13. Tire storage in buildings shall also comply with Chapter 32.

3401.2 Permit required. Permits shall be required as set forth in Section 105.5.

SECTION 3402—DEFINITIONS

3402.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 3403—TIRE REBUILDING

3403.1 Construction. Tire rebuilding plants shall comply with the requirements of the *California Building Code*, as to construction, separation from other buildings or other portions of the same building, and protection.

3403.2 Location. Buffing operations shall be located in a room separated from the remainder of the building housing the tire rebuilding or tire recapping operations by a 1-hour fire barrier.

Exception: Buffing operations are not required to be separated where all of the following conditions are met:

1. Buffing operations are equipped with an approved continuous automatic water-spray system directed at the point of cutting action.
2. Buffing machines are connected to particle-collecting systems providing a minimum air movement of 1,500 cubic feet per minute (cfm) (0.71 m^3/s) in volume and 4,500 feet per minute (fpm) (23 m/s) in-line velocity.
3. The collecting system shall discharge the rubber particles to an approved outdoor noncombustible or fire-resistant container that is emptied at frequent intervals to prevent overflow.

3403.3 Cleaning. The buffing area shall be cleaned at frequent intervals to prevent the accumulation of rubber particles.

3403.4 Spray rooms and booths. Each spray room or spray booth where flammable or combustible solvents are applied, shall comply with Chapter 24.

SECTION 3404—PRECAUTIONS AGAINST FIRE

3404.1 Open burning. Open burning is prohibited in tire storage yards.

3404.2 Sources of heat. *Open flame, cutting, welding or heating devices blow torches or highly flammable materials including, but not limited to, inner tubes are prohibited within 40 feet of a waste tire pile.*

3404.3 Smoking prohibited. Smoking is prohibited in tire storage yards, except in designated areas.

3404.4 Power lines. Tire storage piles shall not be located beneath electrical power lines having a voltage in excess of 750 volts or that supply power to fire emergency systems.

3404.5 Fire safety plan. The owner or individual in charge of the tire storage yard shall be required to prepare and submit to the fire code official a fire safety plan for review and approval. The fire safety plan shall include provisions for fire department vehicle access. Not less than one copy of the fire safety plan shall be prominently posted and maintained at the storage yard.

3404.6 Telephone number. The telephone number of the fire department and location of the nearest telephone shall be posted conspicuously in attended locations.

SECTION 3405—OUTDOOR STORAGE

3405.1 Individual piles. Tire storage shall be restricted to individual piles not exceeding 5,000 square feet (464.5 m^2) of continuous area. *Pile width shall not exceed 50 feet.* Piles shall not exceed 50,000 cubic feet (1416 m^3) in volume or 10 feet (3048 mm) in height.

3405.2 Separation of piles. Individual tire storage piles shall be separated from other piles by a clear space of not less than 40 feet (12 192 mm).

3405.3 Distance between piles of other stored products. Tire storage piles shall be separated by a clear space of not less than 40 feet (12 192 mm) from piles of other stored product.

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3405.4 Distance from lot lines and buildings. Tire storage piles shall be located not less than 50 feet (15 240 mm) from *lot lines* and buildings.

Exceptions:

1. *Tire storage piles containing less than 500 tires shall be permitted to be located no closer than 10 feet (3048 mm) from lot lines or from buildings. Tire storage piles shall not exceed 6 feet (1829 mm) in height when within 20 feet of any property line, building or perimeter fencing. Side slopes shall not exceed 60 degrees. When approved by the fire code official in accordance with Section 1.11.2.4, distances of less than 10 feet (3048 mm) from lot lines or from buildings may be approved.*
2. *When approved by the fire code official in accordance with Section 1.11.2.4, exempted facilities defined in Public Resources Code, Sections 42808(c) and 42831 and used tires as defined in Section 42806.5, tire storage piles shall be permitted to be located no closer than 10 feet (3048 mm) from lot lines or from buildings. Tire storage piles shall not exceed 6 feet (1829 mm) in height when within 20 feet of any property line or perimeter fencing. Side slopes shall not exceed 60 degrees.*
3. *When approved by the fire code official in accordance with Section 1.11.2.4, "minor waste tire facilities" as defined in Public Resources Code, Section 42808, tire storage piles shall be permitted to be located no closer than 10 feet (3048 mm) from lot lines or 50 feet (15 240 mm) from buildings. Tire storage piles shall not exceed 6 feet (1829 mm) in height when within 20 feet of any property line or perimeter fencing. Side slopes shall not exceed 60 degrees.*
4. *Existing "minor waste tire storage facilities" as defined in Public Resources Code, Section 42808, legally permitted prior to January 1, 2011, shall be permitted to maintain tire storage piles located no closer than 10 feet (3048 mm) from lot lines or 50 feet (15 240 mm) from buildings. Tire storage piles shall not exceed 6 feet (1829 mm) in height when within 20 feet (6096 mm) of any property line or perimeter fencing. Side slopes shall not exceed 60 degrees.*

3405.5 Fire breaks. Storage yards shall be maintained free from combustible ground vegetation for a distance of 40 feet (12 192 mm) from the stored material to grass and weeds; and for a distance of 100 feet (30 480 mm) from the stored product to brush and forested areas.

3405.6 Volume more than 150,000 cubic feet. Where the bulk volume of stored product is more than 150,000 cubic feet (4248 m^3), storage arrangement shall be in accordance with the following:

1. Individual storage piles shall comply with size and separation requirements in Sections 3405.1 through 3405.5.
2. Adjacent storage piles shall be considered to be a group, and the aggregate volume of storage piles in a group shall not exceed 150,000 cubic feet (4248 m^3).

Separation between groups shall be not less than 75 feet (22 860 mm) wide.

3405.7 Location of storage. Outdoor waste tire storage shall not be located *in any of the following:*

1. Under bridges, elevated trestles, elevated roadways or elevated railroads.
2. *In any area where they may be subjected to immersion in water during a 100-year storm, unless the operator demonstrates that the facility will be designed and operated so as to prevent waste tires from migrating off-site.*
3. *On surfaces with grades or other physical features that will interfere with firefighting equipment or personnel unless mitigating measures have been approved in writing by the local fire authority or a fire safety engineer registered by the State of California. Measures established by a fire safety engineer shall be subject to approval by the local fire authority.*

3405.8 Rim removal. *Waste tires stored on rims shall be stored separate from other waste tires.*

3405.9 Pyrolytic oil runoff. *The facility shall be designed and constructed to provide protection to bodies of water from runoff of pyrolytic oil resulting from a potential tire fire.*

SECTION 3406—FIRE DEPARTMENT ACCESS

3406.1 Required access. New *and existing* tire storage yards shall be provided with fire apparatus access roads in accordance with Section 503 and Section 3406.2. Existing tire storage yards shall be provided with fire apparatus access roads where required in Chapter 11.

3406.2 Location. Fire apparatus access roads shall be located within all pile clearances identified in Section 3405.4 and within all fire breaks required in Section 3405.5. Access roadways shall be within 150 feet (45 720 mm) of any point in the storage yard where storage piles are located, not less than 20 feet (6096 mm) from any storage pile.

SECTION 3407—FENCING

3407.1 Where required. Where the bulk volume of stored material is more than 20,000 cubic feet (566 m^3), a firmly anchored fence or other approved method of security that controls unauthorized access to the storage yard shall surround the storage yard.

3407.2 Construction. The fence shall be constructed of approved materials and shall be not less than 6 feet (1829 mm) high and provided with gates not less than 20 feet (6096 mm) wide.

3407.3 Locking. Gates to the storage yard shall be locked when the storage yard is not staffed.

3407.4 Unobstructed. Gateways shall be kept clear of obstructions and be fully openable at all times.

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SECTION 3408—FIRE PROTECTION

3408.1 Water supply. A public or private fire protection water supply shall be provided in accordance with Section 507 *and shall be capable of delivering at least 1,000 gallons per minute (gpm) for a duration of at least three hours and at least 2,000 gpm for a duration of at least three hours if the sum of altered plus whole waste tires exceeds 10,000.* The water supply shall be arranged such that any part of the storage yard can be reached by using not more than 500 feet (152 m) of hose.

3408.2 Fire extinguishers. Buildings or structures shall be provided with portable fire extinguishers in accordance with Section 906. Fuel-fired vehicles operating in the storage yard shall be equipped with a minimum 2-A:20-B:C-rated portable fire extinguisher.

SECTION 3409—INDOOR STORAGE ARRANGEMENT

3409.1 Pile dimensions. Where tires are stored on-tread, the dimension of the pile in the direction of the wheel hole shall be not more than 50 feet (15 240 mm). Tires stored adjacent to or along one wall shall not extend more than 25 feet (7620 mm) from that wall. Other piles shall be not more than 50 feet (15 240 mm) in width.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 35 – WELDING AND OTHER HOT WORK

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

35

WELDING AND OTHER HOT WORK

User notes:

About this chapter: Chapter 35 covers requirements for safety in welding and other types of hot work by reducing the potential for fire ignitions that usually result in large losses. Several different types of hot work would fall under the requirements found in Chapter 35, including both gas and electric arc methods and any open-torch operations. Many of the activities of this chapter focus on the actions of the occupants.

SECTION 3501—GENERAL

3501.1 Scope. Welding, cutting, open torches and other hot work operations and equipment shall comply with this chapter.

3501.2 Permits. Permits shall be required as set forth in Section 105.5.

3501.3 Restricted areas. Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a hot work program. Hot work shall not be conducted in the following areas unless approval has been obtained from the fire code official:

1. Areas where the automatic sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust or loose combustible materials.
4. On board ships at dock or ships under construction or repair.
5. At other locations as specified by the fire code official.

3501.4 Cylinders and containers. Compressed gas cylinders and fuel containers shall comply with this chapter and Chapter 53.

3501.5 Design and installation of oxygen-fuel gas systems. An oxygen-fuel gas system with two or more manifolded cylinders of oxygen shall be in accordance with NFPA 51.

SECTION 3502—DEFINITIONS

3502.1 Definitions. The following terms are defined in Chapter 2:

HOT WORK.

HOT WORK AREA.

HOT WORK EQUIPMENT.

HOT WORK PERMITS.

HOT WORK PROGRAM.

RESPONSIBLE PERSON.

SECTION 3503—GENERAL REQUIREMENTS

3503.1 General. Hot work conditions and operations shall comply with this chapter.

3503.2 Temporary and fixed hot work areas. Temporary and fixed hot work areas shall comply with this section.

3503.3 Hot work program permit. Hot work permits, issued by an approved responsible person under a hot work program, shall be available for review by the fire code official at the time the work is conducted and for 48 hours after work is complete.

3503.4 Qualifications of operators. A permit for hot work operations shall not be issued unless the individuals in charge of performing such operations are capable of performing such operations safely. Demonstration of a working knowledge of the provisions of this chapter shall constitute acceptable evidence of compliance with this requirement.

3503.5 Records. The individual responsible for the hot work area shall maintain "prework check" reports in accordance with Section 3504.3.1. Such reports shall be maintained on the premises for not less than 48 hours after work is complete.

3503.6 Signage. Visible hazard identification signs shall be provided where required by Chapter 50. Where the hot work area is open to persons other than the operator of the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Such signs shall display the following warning:

CAUTION
HOT WORK IN PROGRESS
STAY CLEAR

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SECTION 3504—FIRE SAFETY REQUIREMENTS

3504.1 Protection of combustibles. Protection of combustibles shall be in accordance with Sections 3504.1.1 through 3504.1.9.

3504.1.1 Combustibles. Hot work areas shall not contain combustibles or shall be provided with appropriate shielding to prevent sparks, slag or heat from igniting exposed combustibles.

3504.1.2 Openings. Openings or cracks in walls, floors, ducts or shafts within the hot work area shall be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal fire-resistant guards, or curtains shall be provided to prevent passage of sparks or slag.

3504.1.3 Housekeeping. Floors shall be kept clean within the hot work area.

3504.1.4 Conveyor systems. Conveyor systems that are capable of carrying sparks to distant combustibles shall be shielded or shut down.

3504.1.5 Partitions. Partitions segregating hot work areas from other areas of the building shall be noncombustible. In fixed hot work areas, the partitions shall be securely connected to the floor such that gaps do not exist between the floor and the partition. Partitions shall prevent the passage of sparks, slag, and heat from the hot work area.

3504.1.6 Floors. Fixed hot work areas shall have floors with noncombustible surfaces.

3504.1.7 Precautions in hot work. Hot work shall not be performed on containers or equipment that contain or have contained flammable liquids, gases or solids until the containers and equipment have been thoroughly cleaned, inerted or purged; except that "hot tapping" shall be allowed on tanks and pipe lines where such work is to be conducted by approved personnel. Hot work on flammable and combustible liquid storage tanks shall be conducted in accordance with Section 3510.

3504.1.8 Sprinkler protection. Automatic sprinkler protection shall not be shut off while hot work is performed. Where hot work is performed close to automatic sprinklers, noncombustible barriers or damp cloth guards shall shield the individual sprinkler heads and shall be removed when the work is completed. If the work extends over several days, the shields shall be removed at the end of each workday. The fire code official shall approve hot work where sprinkler protection is impaired.

3504.1.9 Fire detection systems. Approved special precautions shall be taken to avoid accidental operation of automatic fire detection systems.

3504.2 Fire watch. Fire watches shall be established and conducted in accordance with Sections 3504.2.1 through 3504.2.6.

3504.2.1 When required. A fire watch shall be provided during hot work activities and shall continue for not less than 30 minutes after the conclusion of the work. The fire code official, or the responsible manager under a hot work program, is authorized to extend the fire watch based on the hazards or work being performed.

Exception: Where the hot work area has no fire hazards or combustible exposures.

3504.2.2 Location. The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

3504.2.3 Duties. Individuals designated to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment. Individuals assigned to fire watch duty shall be responsible for extinguishing spot fires and communicating an alarm.

3504.2.4 Fire training. The individuals responsible for performing the hot work and individuals responsible for providing the fire watch shall be trained in the use of portable fire extinguishers.

3504.2.5 Fire hoses. Where hoselines are required, they shall be connected, charged and ready for operation.

3504.2.6 Fire extinguisher. Not less than one portable fire extinguisher complying with Section 906 and with a minimum 2-A:20-B:C rating shall be provided with ready access within 30 feet (9144 mm) of the location where hot work is performed.

3504.3 Area reviews. Before hot work is permitted and not less than once per day while the permit is in effect, the area shall be inspected by the individual responsible for authorizing hot work operations to ensure that it is a fire safe area. Information shown on the permit shall be verified prior to signing the permit in accordance with Section 105.5.

3504.3.1 Pre-hot-work check. A pre-hot-work check shall be conducted prior to work to ensure that all equipment is safe and hazards are recognized and protected. A report of the check shall be kept at the work site during the work and available upon request. The pre-hot-work check shall determine all of the following:

1. Hot work equipment to be used shall be in satisfactory operating condition and in good repair.
2. Hot work site is clear of combustibles or combustibles are protected.
3. Exposed construction is of noncombustible materials or, if combustible, then protected.
4. Openings are protected.
5. Floors are kept clean.
6. Exposed combustibles are not located on the opposite side of partitions, walls, ceilings or floors.
7. Fire watches, where required, are assigned.
8. Approved actions have been taken to prevent accidental activation of fire protection system equipment in accordance with Sections 3504.1.8 and 3504.1.9.
9. Fire extinguishers and fire hoses (where provided) are operable and available.

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SECTION 3505—GAS WELDING AND CUTTING

3505.1 General. Devices or attachments mixing air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blow pipe, shall not be allowed unless approved.

3505.2 Cylinder and container storage, handling and use. Storage, handling and use of compressed gas cylinders, containers and tanks shall be in accordance with this section and Chapter 53.

3505.2.1 Cylinders connected for use. The storage or use of a single cylinder of oxygen and a single cylinder of fuel gas located on a cart shall be allowed without requiring the cylinders to be separated in accordance with Section 5003.9.8 or 5003.10.3.6 when the cylinders are connected to regulators, ready for service, equipped with apparatus designed for cutting or welding and all of the following:

1. Carts shall be kept away from the cutting or welding operation in accordance with Section 3505.5 or fire-resistant shields shall be provided.
2. Cylinders shall be secured to the cart to resist movement.
3. Carts shall be in accordance with Section 5003.10.3.
4. Cylinder valves not having fixed hand wheels shall have keys, handles or nonadjustable wrenches on valve stems while the cylinders are in service.
5. Cylinder valve outlet connections shall conform to the requirements of CGA V-1.
6. Cylinder valves shall be closed when work is finished.
7. Cylinder valves shall be closed before moving the cart.

3505.2.1.1 Individual cart separation. Individual carts shall be separated from each other in accordance with Section 5003.9.8.

3505.3 Precautions. Cylinders, valves, regulators, hose and other apparatus and fittings for oxygen shall be kept free from oil or grease. Oxygen cylinders, apparatus and fittings shall not be handled with oily hands, oily gloves, or greasy tools or equipment.

3505.4 Acetylene gas. Acetylene gas shall not be piped except in approved cylinder manifolds and cylinder manifold connections, or utilized at a pressure exceeding 15 pounds per square inch gauge (psig) (103 kPa) unless dissolved in a suitable solvent in cylinders manufactured in accordance with DOTn 49 CFR Part 178. Acetylene gas shall not be brought in contact with unalloyed copper, except in a blowpipe or torch.

3505.5 Remote locations. Oxygen and fuel-gas cylinders and acetylene generators shall be located away from the hot work area to prevent such cylinders or generators from being heated by radiation from heated materials, sparks or slag, or misdirection of the torch flame.

3505.6 Cylinders shutoff. The torch valve shall be closed and the gas supply to the torch completely shut off when gas welding or cutting operations are discontinued for a period of 1 hour or more.

3505.7 Prohibited operation. Welding or cutting work shall not be held or supported on compressed gas cylinders or containers.

3505.8 Tests. Tests for leaks in piping systems and equipment shall be made with soapy water. The use of flames shall be prohibited for leak testing.

SECTION 3506—ELECTRIC ARC HOT WORK

3506.1 General. The frame or case of electric hot work machines, except internal-combustion-engine-driven machines, shall be grounded. Ground connections shall be mechanically strong and electrically adequate for the required current.

3506.2 Return circuits. Welding current return circuits from the work to the machine shall have proper electrical contact at joints. The electrical contact shall be periodically inspected.

3506.3 Disconnecting. Electrodes shall be removed from the holders when electric arc welding or cutting is discontinued for any period of 1 hour or more. The holders shall be located to prevent accidental contact and the machines shall be disconnected from the power source.

3506.4 Emergency disconnect. A switch or circuit breaker shall be provided so that fixed electric welders and control equipment can be disconnected from the supply circuit. The disconnect shall be installed in accordance with *the California Electrical Code.*

3506.5 Damaged cable. Damaged cable shall be removed from service until properly repaired or replaced.

SECTION 3507—CALCIUM CARBIDE SYSTEMS

3507.1 Calcium carbide storage. Storage and handling of calcium carbide shall comply with Chapter 50 of this code and Chapter 9 of NFPA 51.

SECTION 3508—ACETYLENE GENERATORS

3508.1 Use of acetylene generators. The use of acetylene generators shall comply with this section and Chapter 15 of NFPA 55.

3508.2 Portable generators. The minimum volume of rooms containing portable generators shall be 35 times the total gas-generating capacity per charge of all generators in the room. The gas-generating capacity in cubic feet per charge shall be assumed to be 4.5 times the weight of carbide per charge in pounds. The minimum ceiling height of rooms containing generators shall be 10 feet (3048 mm). An acetylene generator shall not be moved by derrick, crane or hoist while charged.

3508.3 Protection against freezing. Generators shall be located where water will not freeze. Common salt such as sodium chloride or other corrosive chemicals shall not be utilized for protection against freezing.

SECTION 3509—PIPING MANIFOLDS AND HOSE SYSTEMS FOR FUEL GASES AND OXYGEN

3509.1 General. The use of piping manifolds and hose systems shall be in accordance with Sections 3509.2 through 3509.7, Chapter 53 and Chapter 5 of NFPA 51.

3509.2 Protection. Piping shall be protected against physical damage.

3509.3 Signage. Signage shall be provided for piping and hose systems as follows:

1. Above-ground piping systems shall be marked in accordance with ASME A13.1.
2. Station outlets shall be marked to indicate their intended usage.
3. Signs shall be posted, indicating clearly the location and identity of section shutoff valves.

3509.4 Manifolding of cylinders. Oxygen manifolds shall not be located in an acetylene generator room. Oxygen manifolds shall be located not less than 20 feet (6096 mm) away from combustible material such as oil or grease, and gas cylinders containing flammable gases, unless the gas cylinders are separated by a fire partition.

3509.5 Identification of manifolds. Signs shall be posted for oxygen manifolds with service pressures not exceeding 200 psig (1379 kPa). Such signs shall include the words:

LOW-PRESSURE MANIFOLD
DO NOT CONNECT HIGH-PRESSURE CYLINDERS
MAXIMUM PRESSURE 250 PSIG

3509.6 Clamps. Hose connections shall be clamped or otherwise securely fastened.

3509.7 Inspection. Hoses shall be inspected frequently for leaks, burns, wear, loose connections or other defects rendering the hose unfit for service.

SECTION 3510—HOT WORK ON FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE TANKS

3510.1 General. Hot work performed on the interior or exterior of tanks that hold or have held flammable or combustible liquids shall be in accordance with Section 3510.2 and Chapters 4, 5, 6, 7 and 10 of NFPA 326.

3510.2 Prevention. The following steps shall be taken to minimize hazards where hot work must be performed on a flammable or combustible liquid storage container:

1. Use alternative methods to avoid hot work where possible.
2. Analyze the hazards prior to performing hot work, identify the potential hazards and the methods of hazard control.
3. Hot work shall conform to the requirements of the code or standard to which the container was originally fabricated.
4. Test the immediate and surrounding work area with a combustible gas detector and provide for a means of continuing monitoring while conducting the hot work.
5. Qualified employees and contractors performing hot work shall use an industry-approved hot work permit system to control the work.
6. Personnel shall be properly trained on hot work policies and procedures regarding equipment, safety, hazard controls and job-specific requirements.
7. On-site safety supervision shall be present where hot work is in progress to protect the personnel conducting the hot work and provide additional overview of site-specific hazards.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 36 – MARINAS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

36 MARINAS

User notes:

About this chapter: Chapter 36 addresses the fire protection and prevention requirements for marinas. It was developed in response to the complications encountered by a number of fire departments responsible for the protection of marinas as well as fire loss history in marinas that lacked fire protection. Compliance with this chapter intends to establish safe practices in marina areas, provide an identification method for mooring spaces in the marina, and provide firefighters with safe operational areas and fire protection methods to extend hose lines in a safe manner.

SECTION 3601—SCOPE

3601.1 Scope. Marina facilities shall be in accordance with this chapter.

3601.2 Plans and approvals. Plans for marina fire protection facilities shall be approved prior to installation. The work shall be subject to final inspection and approval after installation.

SECTION 3602—DEFINITIONS

3602.1 Definitions. The following terms are defined in Chapter 2:

FLOAT.

MARINA.

PIER.

VESSEL.

WHARF.

SECTION 3603—GENERAL PRECAUTIONS

3603.1 Combustible debris. Combustible debris and rubbish shall not be deposited or accumulated on land beneath marina structures, piers or wharves.

3603.2 Sources of ignition. Open-flame devices used for lighting or decoration on the exterior of a vessel, float, pier or wharf shall be approved.

3603.3 Flammable or combustible liquid spills. Spills of flammable or combustible liquids at or on the water shall be reported immediately to the fire department or jurisdictional authorities.

3603.4 Rubbish containers. Containers with tight-fitting or self-closing lids shall be provided for temporary storage of combustible debris, rubbish and waste material. The rubbish containers shall be constructed entirely of materials that comply with any one of the following:

1. Noncombustible materials.
2. Materials that meet a peak rate of heat release not exceeding 300 kW/m^2 where tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

3603.5 Electrical equipment. Electrical equipment shall be installed and used in accordance with its listing, Section 603 of this code and Chapter 5 of NFPA 303 as required for wet, damp and hazardous locations.

3603.6 Berthing and storage. Berthing and storage shall be in accordance with Chapter 7 of NFPA 303.

3603.7 Slip identification. Slips and mooring spaces shall be individually identified by an approved numeric or alphabetic designator. Space designators shall be posted at the space. Signs indicating the space designators located on finger piers and floats shall be posted at the base of all piers, finger piers, floats and finger floats.

SECTION 3604—FIRE PROTECTION EQUIPMENT

3604.1 General. Piers, marinas and wharves with facilities for mooring or servicing five or more vessels, and marine motor fuel-dispensing facilities shall be equipped with fire protection equipment in accordance with Sections 3604.2 through 3604.6.

3604.2 Standpipes. Marinas and boatyards shall be equipped throughout with standpipe systems in accordance with NFPA 303. Systems shall be provided with hose connections located such that no point on the marina pier or float system exceeds 150 feet (15 240 mm) from a standpipe hose connection.

3604.2.1 Identification of standpipe outlets. Standpipe hose connection locations shall be clearly identified by a flag or other approved means designed to be readily visible from the pier accessing the float system.

3604.3 Access and water supply. Piers and wharves shall be provided with fire apparatus access roads and water-supply systems with on-site fire hydrants where required by the fire code official. Such roads and water systems shall be provided and maintained in accordance with Sections 503 and 507.

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3604.4 Portable fire extinguishers. One portable fire extinguisher of the ordinary (moderate) hazard type shall be provided at each required standpipe hose connection. Additional portable fire extinguishers, suitable for the hazards involved, shall be provided and maintained in accordance with Section 906.

3604.5 Communications. A telephone not requiring a coin to operate or other approved, clearly identified means to notify the fire department shall be provided on the site in a location approved by the fire code official.

3604.6 Emergency operations staging areas. Space shall be provided on all float systems for the staging of emergency equipment. Emergency operation staging areas shall provide a minimum of 4 feet wide by 10 feet long (1219 mm by 3048 mm) clear area exclusive of walkways and shall be located at each standpipe hose connection. Emergency operation staging areas shall be provided with a curb or barrier having a minimum height of 4 inches (102 mm) and maximum space between the bottom edge and the surface of the staging area of 2 inches (51 mm) on the outboard sides of the staging area.

An approved sign reading "FIRE EQUIPMENT STAGING AREA—KEEP CLEAR" shall be provided at each staging area.

SECTION 3605—MARINE MOTOR FUEL-DISPENSING FACILITIES

3605.1 Fuel dispensing. Marine motor fuel-dispensing facilities shall be in accordance with Chapter 23.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 37 – COMBUSTIBLE FIBERS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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The state agency does not adopt sections identified by the following symbol: †

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CHAPTER

37 COMBUSTIBLE FIBERS

User notes:

About this chapter: Chapter 37 establishes the requirements for storage and handling of combustible fibers, including animal, vegetable and synthetic fibers, whether woven into textiles, baled, packaged or loose. Operations involving combustible fibers are typically associated with salvage, paper milling, recycling, cloth manufacturing, carpet and textile mills and agricultural operations, among others. The primary hazard associated with these operations is the abundance of materials and their ready ignitability.

SECTION 3701—GENERAL

3701.1 Scope. The equipment, processes and operations involving combustible fibers shall comply with this chapter.

3701.2 Applicability. Storage of combustible fibers in any quantity shall comply with this section.

3701.3 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 3702—DEFINITIONS

3702.1 Definitions. The following terms are defined in Chapter 2:

BALED COTTON.

BALED COTTON, DENSELY PACKED.

COMBUSTIBLE FIBERS.

COTTON.

SEED COTTON.

SECTION 3703—GENERAL PRECAUTIONS

3703.1 Use of combustible receptacles. Ashes, waste, rubbish or sweepings shall not be placed in wood or other combustible receptacles and shall be removed daily from the structure.

3703.2 Vegetation. Grass or weeds shall not be allowed to accumulate at any point on the premises.

3703.3 Clearances. A minimum clearance of 3 feet (914 mm) shall be maintained between automatic sprinklers and the top of piles.

3703.4 Agricultural products. Hay, straw, seed cotton or similar agricultural products shall not be stored adjacent to structures or combustible materials unless a clear horizontal distance equal to the height of a pile is maintained between such storage and structures or combustible materials. Storage shall be limited to stacks of 100 tons (91 metric tons) each. Stacks shall be separated by not less than 20 feet (6096 mm) of clear space. Quantities of hay, straw, seed cotton and other agricultural products shall not be limited where stored in or near farm structures located outside closely built areas. A permit shall not be required for agricultural storage.

3703.5 Dust collection. Where located within a building, equipment or machinery that generates or emits combustible fibers shall be provided with an approved dust-collecting and exhaust system. Such systems shall comply with Chapter 22 of this code and Section 510 of the *California Mechanical Code*.

3703.6 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with Section 906 as required for extra-hazard occupancy protection as indicated in Table 906.1.

3703.7 Sources of ignition. Sources of ignition shall comply with Sections 3703.7.1 and 3703.7.2.

3703.7.1 Smoking. Smoking shall be prohibited and "No Smoking" signs provided as follows:

1. In rooms or areas where materials are stored or dispensed or used in open systems.
2. Within 25 feet (7620 mm) of outdoor storage or open use areas.
3. Facilities or areas within facilities that have been designated as totally "no smoking" shall have "No Smoking" signs placed at all entrances to the facility or area. Designated areas within such facilities where smoking is permitted either permanently or temporarily shall be identified with signs designating that smoking is permitted in these areas only.

Signs required by this section shall be in English as a primary language or in symbols allowed by this code and shall comply with Section 310.

3703.7.2 Open flames. Open flames and high-temperature devices shall not be used in a manner that creates a hazardous condition. High-temperature devices and those devices utilizing an open flame shall be listed for use with the materials stored or used.

SECTION 3704—LOOSE FIBER STORAGE

3704.1 General. Loose combustible fibers, not in suitable bales or packages and stored outdoors in the open, shall comply with Section 2808. Occupancies involving the indoor storage of loose combustible fibers in amounts exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall comply with Sections 3704.2 through 3704.6.

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3704.2 Storage of 100 cubic feet or less. Loose combustible fibers in quantities of not more than 100 cubic feet (3 m^3) located in a structure shall be stored in a metal or metal-lined bin equipped with a self-closing cover.

3704.3 Storage of more than 100 cubic feet to 500 cubic feet. Loose combustible fibers in quantities exceeding 100 cubic feet (3 m^3) but not exceeding 500 cubic feet (14 m^3) shall be stored in rooms enclosed with 1-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with openings protected by an approved opening protective assembly having a fire protection rating of $^3/_4$ hour in accordance with the *California Building Code*.

3704.4 Storage of more than 500 cubic feet to 1,000 cubic feet. Loose combustible fibers in quantities exceeding 500 cubic feet (14 m^3) but not exceeding 1,000 cubic feet (28 m^3) shall be stored in rooms enclosed with 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with openings protected by an approved opening protective assembly having a fire protection rating of $1^1/_2$ hours in accordance with the *California Building Code*.

3704.5 Storage of more than 1,000 cubic feet. Loose combustible fibers in quantities exceeding 1,000 cubic feet (28 m^3) shall be stored in rooms enclosed with 2-hour fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with openings protected by an approved opening protective assembly having a fire protection rating of $1^1/_2$ hours in accordance with the *California Building Code*. The storage room shall be protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1.

3704.6 Detached storage structure. Not more than 2,500 cubic feet (70 m^3) of loose combustible fibers shall be stored in a detached structure suitably located, with openings protected against entrance of sparks. The structure shall not be occupied for any other purpose.

SECTION 3705—BALED STORAGE

3705.1 Bale size and separation. Baled combustible fibers shall be limited to single blocks or piles not more than 25,000 cubic feet (700 m^3) in volume, not including aisles or clearances. Blocks or piles of baled fiber shall be separated from adjacent storage by aisles not less than 5 feet (1524 mm) wide, or by flash-fire barriers constructed of continuous sheets of noncombustible material extending from the floor to a minimum height of 1 foot (305 mm) above the highest point of the piles and projecting not less than 1 foot (305 mm) beyond the sides of the piles.

3705.2 Special baling conditions. Sisal and other fibers in bales bound with combustible tie ropes, jute and other fibers that swell when wet, shall be stored to allow for expansion in any direction without affecting building walls, ceilings or columns. A minimum clearance of 3 feet (914 mm) shall be required between walls and sides of piles, except that where the storage compartment is not more than 30 feet (9144 mm) wide, the minimum clearance at side walls shall be 1 foot (305 mm), provided that a center aisle not less than 5 feet (1524 mm) wide is maintained.

CHAPTER
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RESERVED

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 39 – PROCESSING AND EXTRACTION FACILITIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

39

PROCESSING AND EXTRACTION FACILITIES

User notes:

About this chapter: Chapter 39 focuses on the processing and extraction of oils and fats from various plants. This process includes extraction by use of a solvent, desolventizing the raw material, production of the miscella, distillation of the solvent from the miscella and solvent recovery. The processes used are not necessarily typical hazardous material processes, and often the systems and equipment associated with such processes may not be listed. This chapter provides the tools to appropriately address the hazards while also meeting the unique needs of industry. This chapter has provisions for a technical report prepared by a registered design professional and requires site inspections to make sure equipment and systems are installed as designed and approved.

SECTION 3901—GENERAL

3901.1 Scope. Facilities where plant processing and solvent-based extraction are conducted, including but not limited to cultivation and related activities, pre-extraction or post-extraction, shall comply with this chapter and the *California Building Code*. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this chapter, other applicable provisions of this code and the *California Building Code*.

Exception: Greenhouses in compliance with Section 3112 of the *California Building Code* not utilizing carbon dioxide enrichment.

3901.2 Existing buildings or facilities. Existing buildings or facilities used for the processing or extraction of plant oils using solvents shall comply with this chapter. Existing extraction processes where the medium of extraction is changed to include the use of solvents shall comply with this chapter.

3901.3 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

3901.4 Lighting. Where used, horticultural lights or lighting systems shall be listed and labeled in accordance with UL 8800 and installed in accordance with the listing, the manufacturer's installation instructions and *the California Electrical Code*.

3901.5 Carbon dioxide generation. Carbon dioxide-enriched atmospheres generated using methods to create carbon dioxide as a byproduct shall meet the requirements of Sections 5307.4.1 through 5307.4.7.

SECTION 3902—DEFINITIONS

3902.1 Definitions. The following terms are defined in Chapter 2:

DESOLVENTIZING.

MISCELLA.

SECTION 3903—PROCESSING AND EXTRACTION

3903.1 Construction. Processing shall be located in a building complying with the *California Building Code*.

3903.2 Prohibited occupancies. Extraction processes utilizing flammable gases or flammable cryogenic fluids shall not be located in any building containing a Group A, E, I or R occupancy.

3903.3 Location. The extraction equipment and extraction processes utilizing hydrocarbon solvents shall be located in a room or area dedicated to extraction.

3903.4 Post-process purification and winterization. Post-processing and winterization involving the heating or pressurizing of the miscella to other than normal pressure or temperature shall be approved and performed in an appliance listed for such use. Domestic or commercial cooking appliances shall not be used.

3903.4.1 Industrial ovens. The use of industrial ovens shall comply with Chapter 30.

3903.5 Use of flammable and combustible liquids. The use of flammable and combustible liquids for liquid extraction processes where the liquid is boiled, distilled or evaporated shall be located within a hazardous exhaust fume hood, rated for exhausting flammable vapors. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres. Heating of flammable or combustible liquids over an open flame is prohibited.

Exception: The use of a heating element not rated for flammable atmospheres, where documentation from the manufacture, or approved testing laboratory indicates the element is rated for heating of flammable liquids.

3903.6 Liquefied petroleum gas. Liquefied petroleum gases shall not be released to the atmosphere except where released in accordance with Section 7.3 of NFPA 58.

3903.7 Means of egress. Exit and exit access doors from rooms or areas used for extraction shall swing in the direction of egress travel.

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SECTION 3904—SYSTEMS AND EQUIPMENT

3904.1 General requirements. Systems and equipment used with the processing or extraction of oils and products from plants shall comply with Sections 3904.2 through 3904.2.2.3 and Section 5003.2, and other applicable provisions of this code, the *California Building Code* and the *California Mechanical Code*.

3904.2 Systems and equipment. Systems or equipment used for the extraction or processing of oils from plant material shall comply with Section 3904.2.1 or 3904.2.2.

3904.2.1 Listings. Systems or equipment used for the extraction of oils from plant material shall be listed and labeled in accordance with UL 1389 and installed in accordance with the listing and the manufacturer's installation instructions.

3904.2.2 Approvals. Systems or equipment used for the extraction of oils from plant material shall be approved for the specific use. The system shall be reviewed by a registered design professional. The registered design professional shall review and consider any information provided by the system's designer or manufacturer. A technical report in accordance with Section 3904.2.2.1 shall be prepared and submitted to the fire code official for review and approval. The firm or individual preparing the technical report shall be approved by the fire code official prior to performing the analysis.

3904.2.2.1 Technical report. A technical report, reviewed and approved by the fire code official as required by Section 3904.2, is required prior to the equipment being located or installed at the facility. The report shall be prepared by a registered design professional or other professional approved by the fire code official.

3904.2.2.2 Report content. The technical report shall contain all of the following:

1. Manufacturer information.
2. Preparer of record of the technical report.
3. Date of review and report revision history.
4. Signature page, including all of the following:
   - 4.1. Author of the report.
   - 4.2. Date of report.
   - 4.3. Date and signature of registered design professional of record performing the design or peer review.
5. Model number of the item evaluated. If the equipment is provided with a serial number, the serial number shall be included for verification at the time of site inspection.
6. Methodology of the design or peer review process used to determine minimum safety requirements. Methodology shall consider the basis of design, and shall include a code analysis and code path to demonstrate whether specific codes or standards are applicable.
7. Equipment description. A list of every component and subassembly, such as fittings, hose, quick disconnects, gauges, site glass, gaskets, valves, pumps, vessels, containers and switches, of the system or equipment, indicating the manufacturer, model number, material and solvent compatibility. Manufacturer's data sheets shall be provided.
8. A general flow schematic or general process flow diagram of the process. Post-processing or winterization shall be included in this diagram. Primary components of the process equipment shall be identified and match the equipment list required in Item 7. Operating temperatures, pressures and solvent state of matter shall be identified in each primary step or component. A piping and instrumentation diagram (PID or P&ID) shall be provided.
9. Analysis of the vessel(s) if pressurized beyond standard atmospheric pressure. Analysis shall include purchased and fabricated components.
10. Structural analysis for the frame system supporting the equipment.
11. Process safety analysis of the extraction system, from the introduction of raw product to the end of the extraction process.
12. Comprehensive process hazard analysis considering failure modes and points of failure throughout the process. The process hazard analysis shall include a review of emergency procedure information provided by the manufacturer of the equipment or process and not that of the facility, building or room.
13. Review of the assembly instructions, operational and maintenance manuals provided by the manufacturer.
14. List of references used in the analysis.

3904.2.2.3 Site inspection. Prior to operation of the extraction equipment, where required by the fire code official, the engineer of record or approved professional, as approved in Section 3904.2, shall inspect the site of the extraction process once equipment has been installed for compliance with the technical report and the building analysis. The engineer of record or approved professional shall provide a report of findings and observations of the site inspection to the fire code official prior to the approval of the extraction process. The field inspection report authored by the engineer of record shall include the serial number of the equipment used in the process and shall confirm that the equipment installed is the same model and type of equipment identified in the technical report.

SECTION 3905—SAFETY SYSTEMS

3905.1 Gas detection. For extraction processes utilizing flammable gases as solvents, a gas detection system complying with Section 916 shall be provided.

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3905.1.1 Operation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visual alarm signals in the extraction room.
2. Deactivation of all heating systems located in the extraction room.
3. Activation of the mechanical ventilation system, where the system is interlocked with gas detection.
4. De-energize all light switches and electrical outlets.

3905.1.2 Failure of the gas detection system. Failure of the gas detection system shall result in the deactivation of the heating system; activation of the mechanical ventilation system where the system is interlocked with the gas detection system; and initiation of a trouble signal to sound in an approved location.

3905.2 Emergency shutoff. Extraction processes utilizing gaseous hydrocarbon-based solvents shall be provided with emergency shutoff systems in accordance with Section 5803.1.3.

3905.3 Ventilation. Continuous mechanical exhaust ventilation shall be provided in accordance with Sections 3905.3.1 through 3905.3.4 and Chapter 4 of the *California Mechanical Code*.

3905.3.1 Extraction processes using flammable or combustible liquids or gases. Continuous mechanical exhaust ventilation shall be provided where extraction processes use flammable or combustible liquids or gases. The mechanical exhaust ventilation shall provide a minimum airflow rate of not less than 5 cfm/ft^2 [0.0254 m^3/(s × m^2)] of floor area to prevent an accumulation of flammable vapors from exceeding 25 percent of the lower explosive limit (LEL).

Exception: Where the registered design professional demonstrates that an engineered mechanical exhaust ventilation system design will prevent the maximum concentration of contaminants from exceeding 25 percent of the LEL, the minimum required rate of exhaust shall be reduced in accordance with such engineered system design.

3905.3.2 Extraction processes using compressed asphyxiant or inert gases. Continuous mechanical exhaust ventilation shall be provided where extraction processes use compressed asphyxiant or inert gases. Mechanical exhaust ventilation shall be provided in accordance with Section 5307.2.

3905.3.3 Post-extraction processes using flammable or combustible liquids or gases. Where flammable liquids, combustible liquids heated above their flashpoint, or flammable gases are used in post-extraction processing the room or area shall be provided with continuous mechanical exhaust in accordance with Section 5004.3.

3905.3.4 Interlocks. Interlocks shall be provided where electrical equipment and appliances are used in processes that generate flammable vapors or gases. Such equipment and appliances shall be interlocked with ventilation fans so that the equipment and appliances cannot be operated unless the exhaust ventilation fans are in operation.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 40 – STORAGE OF DISTILLED SPIRITS AND WINES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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CHAPTER

40

STORAGE OF DISTILLED SPIRITS AND WINES

User notes:

About this chapter:	Chapter 40 provides specific requirements for the storage of distilled spirits and wines. In accordance with Section 307.1.1 of the *California Building Code*, these occupancies are not classified as a Group H occupancy. Instead, as listed in Sections 311.2 and 311.3 of the *California Building Code*, the storage of beverages that contain up to and including 20-percent alcohol are classified as a Group S-2 occupancy, and those that contain over 20-percent alcohol content are classified as a Group S-1 occupancy. Note that those that are classified as a Group S-1 occupancy are required to be provided with an automatic sprinkler system throughout the Group S-1 fire area, regardless of size, in accordance with Section 903.
Bibliography:	FM Global Property Loss Prevention Data Sheet 7-29, Ignitable Liquid Storage in Portable Containers, October 2020 Factory Mutual Insurance Company, Johnson, RI.

SECTION 4001—GENERAL

4001.1 General. The storage of distilled spirits and wines in barrels and casks shall comply with this chapter in addition to other applicable requirements of this code.

4001.1.1 Nonapplicability. Chapter 50 and Chapter 57 are not applicable to the storage of distilled spirits and wines in barrels and casks as identified in Section 5001.1, Exception 10, and Section 5701.2, Item 10.

SECTION 4002—DEFINITIONS

4002.1 Definitions. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 4003—PRECAUTIONS AGAINST FIRE

4003.1 Spill control. Drainage or containment systems shall be provided by means of curbs, scuppers, special drains or other suitable means to prevent the flow of spills throughout the building.

4003.2 Ventilation. For rooms and spaces where distilled spirits and wines in barrels and casks are stored, ventilation shall be provided in accordance with the *California Mechanical Code* and one of the following:

1. The rooms and spaces shall be ventilated at a rate sufficient to maintain the concentration of vapors within the area at or below 25 percent of the lower flammable limit (LFL). This shall be confirmed by sampling the actual vapor concentration under normal operating conditions. The sampling shall be conducted throughout the enclosed storage area, extending to or toward the bottom and the top of the enclosed storage area. The vapor concentration used to determine the required ventilation rate shall be the highest measured concentration during the sampling procedure. The sampling shall be conducted manually or by installation of a continuously monitoring flammable vapor detection system.
2. The rooms and spaces shall be provided exhaust ventilation at a rate of not less than 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of solid floor area. The exhaust ventilation shall be accomplished by natural or mechanical means, with discharge of the exhaust to a safe location outside the building.

4003.3 Sources of ignition. Sources of ignition shall be controlled in accordance with Sections 4003.3.1 through 4003.4.

4003.3.1 Smoking. Smoking shall be prohibited and "No Smoking" signs provided as follows:

1. In rooms or areas where hazardous materials are stored or dispensed or used in open systems in amounts requiring a permit in accordance with Sections 105.5 and 105.6.
2. Within 25 feet (7620 mm) of outdoor storage, dispensing or open-use areas.
3. Facilities or areas within facilities that have been designated as totally "no smoking" shall have "No Smoking" signs placed at all entrances to the facility or area. Designated areas within such facilities where smoking is permitted either permanently or temporarily shall be identified with signs designating that smoking is permitted in these areas only.
4. In rooms or areas where flammable or combustible hazardous materials are stored, dispensed or used.

Signs required by this section shall be in English as a primary language or in symbols allowed by this code and shall comply with Section 310.

4003.3.2 Open flame. Open flames and high-temperature devices shall not be used in a manner that creates a hazardous condition and shall be *listed* for use with the hazardous materials stored or used.

4003.3.3 Industrial trucks. Powered industrial trucks used in areas designated as hazardous (classified) locations in accordance with *the California Electrical Code* shall be listed and labeled for use in the environment intended in accordance with NFPA 505.

4003.3.4 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with Section 603 and *the California Electrical Code.*

4003.4 Lightning. Structures containing barrel storage should be protected from lightning. The lightning protection equipment shall be installed in accordance with *the California Electrical Code* and NFPA 780.

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SECTION 4004—STORAGE

4004.1 Storage. Storage shall be in accordance with this section and Section 315.

4004.2 Empty containers. The storage of empty containers previously used for the storage of flammable or combustible liquids, unless free from explosive vapors, shall be stored as required for filled containers.

4004.3 Basement storage. Class I liquids shall be allowed to be stored in basements in amounts not exceeding the maximum allowable quantity per control area for use-open systems in Table 5003.1.1(1), provided that automatic suppression and other fire protection are provided in accordance with Chapter 9. Class II and IIIA liquids shall also be allowed to be stored in basements, provided that automatic suppression and other fire protection are provided in accordance with Chapter 9.

4004.4 Bulk beverage storage areas. There shall be no storage of combustible materials in the bulk beverage storage areas not related to the beverage storage activities.

SECTION 4005—FIRE PROTECTION

4005.1 Palletized storage of distilled spirits in wooden barrels. The palletized storage of distilled spirits in wooden barrels shall be protected by an approved automatic sprinkler system installed throughout the building in accordance with Section 903.3.1.1 as modified in this section. The palletized storage of metal containers of distilled spirits shall be protected by an approved automatic sprinkler system that complies with Chapter 57.

4005.1.1 Storage height. Palletized storage arrays of barrels stored on end shall be limited to a maximum of seven pallets high.

4005.1.2 Flue spaces. Flue spaces with a minimum width of 6 inches (152 mm) shall be maintained between adjacent pallets.

4005.1.3 Loading aisles. Palletized storage that is provided with a defined loading aisle between pallet storage areas shall be arranged using one of the following:

1. Draft curtains, installed in accordance with Section 4005.1.3.1, shall be provided along the side of palletized storage facing the loading aisle to separate the quick-response sprinklers and standard-response sprinklers.
2. A trench drain shall be provided on each side of the loading aisle, arranged to capture any spilled distilled spirits in the aisle space and remove them from the building to prevent spills from spreading into the barrel storage area.
3. Barrels shall be banded on each pallet to prevent barrels from falling off pallets during transportation and loading into the storage racks.

4005.1.3.1 Draft curtains. Where installed in accordance with Section 4005.1.3, Item 1, draft curtains shall be designed and constructed in accordance with Sections 4005.1.3.1.1 through 4005.1.3.1.3.

4005.1.3.1.1 Construction. Draft curtains shall be constructed of sheet metal, lath and plaster, gypsum board or other *approved* noncombustible materials that provide equivalent performance to resist the passage of smoke. Joints and connections shall be designed to resist the passage of smoke.

4005.1.3.1.2 Location. Draft curtains shall be located along loading aisles serving storage areas.

4005.1.3.1.3 Depth. Draft curtains shall extend vertically downward from the ceiling for a minimum distance of 20 percent of the ceiling height measured from the floor, with a minimum depth of 6 feet (1829 mm).

4005.1.4 Automatic sprinkler system design. Storage heights and automatic sprinkler densities for palletized on-end barrels shall be in accordance with Table 4005.1.4 and Sections 4005.1.4.1 through 4005.1.4.6.

TABLE 4005.1.4—PALLETIZED STORAGE OF DISTILLED SPIRITS WITH UP TO 75 PERCENT ALCOHOL BY VOLUME IN WOODEN BARRELS

PROTECTION AREA	SPRINKLER SYSTEM TYPE	MAXIMUM CEILING HEIGHT (feet)	MAXIMUM STORAGE HEIGHT	CEILING SPRINKLER PROTECTION		
				Response/Nominal Temperature Rating/Orientation	K-Factor (gpm/psi$^{1/2}$)	Design[a], # of Sprinklers @ Pressure (psi)
Barrel storage	Wet-pipe	30	24 feet or 7 barrels	QR/165°F/Pendent	14.0	12 @ 18
	Dry-pipe			SR/286°F/Upright	16.8	24 @ 13
	Wet-pipe	30	1 barrel	Any/165°F/Any	11.2	30 @ 7
	Dry-pipe			SR/286°F/Upright	11.2	50 @ 7
	Wet-pipe	30	2 barrels	SR/286°F/Any	11.2	50 @ 29
Loading aisle w/ draft curtain	Wet-pipe or Dry-pipe	30	NA	SR/286°F/Any	5.6	100 @ 13
					> 8.0	100 @ 7
Loading aisle w/ trench drains or banded barrels or no permanent loading aisle	Provide the barrel storage design across the entire roof area (i.e., storage area and loading aisle).					

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.895 kPa, K-factor of 1 gpm/psi$^{1/2}$ = 14.395 L/min/bar$^{1/2}$, °C = (°F – 32)/1.8.

QR = Quick Response; SR = Standard Response; NA = Not Applicable.

a. Sprinklers shall have a maximum coverage area of 100 square feet.

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4005.1.4.1 Protected product. The storage and automatic sprinkler requirements in Table 4005.1.4 apply to alcohol-water mixtures greater than 20 percent and up to 75 percent alcohol by volume in wooden barrel sizes not exceeding 130 gallons (492 L).

4005.1.4.2 Hose stream allowance. The automatic sprinkler design shall include a 500 gallons per minute (1900 L/min) hose stream allowance.

4005.1.4.3 Water supply duration. The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of 1 hour.

4005.1.4.4 Automatic sprinkler system balancing. Where a permanent loading aisle is provided with a separate automatic sprinkler system on the ceiling, the barrel storage automatic sprinkler design and the loading aisle automatic sprinkler design are not required to be balanced at the point of connection.

4005.1.4.5 Dry pipe sprinkler systems. Where dry-pipe sprinkler systems are installed, the sprinkler system shall be designed to deliver water to the most remote four sprinklers within 40 seconds.

4005.1.4.6 Small distilled spirits facilities. Fire protection for palletized storage of distilled spirits in small distilled spirits facilities not greater than 7,500 square feet (697 m^2) is permitted to be in accordance with Sections 4005.1.4.6.1 through 4005.1.4.6.3.

4005.1.4.6.1 Ceiling clearance. The clearance from the top of storage to the deflector of the automatic sprinklers at the ceiling shall be a minimum of 18 inches (457 mm) and a maximum of 10 feet (3048 mm).

4005.1.4.6.2 Automatic sprinkler coverage area. The automatic sprinkler coverage area shall not exceed 80 square feet (7.4 m^2) per sprinkler.

4005.1.4.6.3 Fire protection scheme. The storage arrangement and automatic sprinkler system design shall be in accordance with Table 4005.1.4.6.3.

TABLE 4005.1.4.6.3—PALLETIZED STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS IN SMALL DISTILLED SPIRITS FACILITIES

PROTECTION AREA	SPRINKLER SYSTEM TYPE	MAXIMUM CEILING HEIGHT (feet)	MAXIMUM STORAGE HEIGHT (feet)	CEILING SPRINKLER PROTECTION			
				Response/Temperature Rating/Orientation	K-Factor (gpm/$psi^{1/2}$)	Sprinkler Density (gpm/ft^2)	Area (square feet)
Barrel storage	Wet-pipe	24	12	SR/286°F/Any	≥ 11.2	0.35	4,000
				SR/165°F/Any	≥ 11.2	0.35	7,500

For SI: 1 foot = 304.8 mm, 1 pound per square inch (psi) = 6.895 kPa, K-factor of 1 gpm/$psi^{1/2}$ = 14.395 L/min/$bar^{1/2}$, °C = (°F – 32)/1.8, 1 gallon per minute per square foot = 40.75 L/min/m^2.
SR = Standard Response.

4005.2 Rack storage in wooden barrels. The rack storage of distilled spirits and wine greater than 20 percent alcohol shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1 and Sections 4005.2.1 through 4005.2.3.6.

4005.2.1 Flue spaces for on-side wooden barrels. Rack storage for on-side wooden barrels shall be provided with a minimum width of 8 inches (203 mm) between adjacent rows of barrels.

4005.2.1.1 Elevated walkways. Where provided, elevated walkways between barrels shall be constructed in accordance with one of the following:

1. Noncombustible materials that are 50 percent open.
2. Noncombustible materials that are open less than 50 percent, provided that the walkway has a maximum width of 1 foot (305 mm) and a minimum gap of 3 inches (76 mm) is provided between the walkway and the barrel storage.
3. Combustible materials that are provided with a row of automatic sprinklers directly beneath each walkway.

4005.2.2 Flue spaces for on-end wooden barrels. Rack storage arrangements with on-end wooden barrels shall be provided with transverse and longitudinal flue spaces with a minimum width of 6 inches (152 mm).

4005.2.3 Fire protection for rack storage. Rack storage arrangements of alcohol-water mixtures up to 75 percent alcohol in wooden barrels with sizes not exceeding 130 gallons (492 L) shall be protected in accordance with Sections 4005.2.3.1 through 4005.2.3.6.

4005.2.3.1 Hose stream allowance. The automatic sprinkler system design shall include a 500-gallon-per-minute (1900 L/min) hose stream allowance.

4005.2.3.2 Water supply duration. The automatic sprinkler system water supply duration, including hose stream demand, shall be a minimum of 1 hour.

4005.2.3.3 Dry-pipe automatic sprinkler system. Where dry-pipe automatic sprinkler systems are installed, the automatic sprinkler system shall be designed to deliver water to the most remote four sprinklers within 40 seconds.

4005.2.3.4 Ceiling automatic sprinkler systems. The automatic sprinkler systems installed at the ceiling shall be designed with a minimum density of 0.2 gallon per minute (0.8 L/min) per square foot with an operating area of 2,000 square feet (186 m^2).

4005.2.3.5 Automatic sprinkler system balancing. The automatic sprinkler system installed at the ceiling and the in-rack sprinkler system shall be balanced at the point of connection.

4005.2.3.6 Automatic sprinkler system design. The design of the automatic sprinkler system at the ceiling and the in-rack sprinkler system shall be in accordance with Table 4005.2.3.6.

TABLE 4005.2.3.6—RACK STORAGE OF DISTILLED SPIRITS IN WOODEN BARRELS

BARREL ARRANGEMENT	SPRINKLER SYSTEM TYPE	MAXIMUM CEILING HEIGHT (feet)	MAXIMUM STORAGE HEIGHT (feet)	MINIMUM AISLE WIDTH (feet)	CEILING SPRINKLER PROTECTION			IN-RACK SPRINKLER PROTECTION			
					Response/ Nominal Temperature Rating/ Orientation	K-Factor (gpm/$psi^{1/2}$)	Design, # of Sprinklers @ Pressure (psi)	Layout	Response/ Nominal Temperature Rating/ Orientation	K-Factor (gpm/$psi^{1/2}$)	Design[a], # of Sprinklers @ Pressure (psi)
On-side	Wet	40	33 feet/ 9 barrels	NA	QR/165°F/ Pendent	14.0	12 @ 37	None			
					SR/286°F/Any	≥ 11.2	20 @ 7	Figures 4005.2.3.6(1) and 4005.2.3.6(2)	QR/165°F/Any	8.0	6 @ 45 (one level of in-racks) or 12 @ 45 (more than one level of in racks)
	Dry	40	33 feet/ 9 barrels	NA	SR/286°F/ Upright	16.8	24 @ 25	None			
					SR/286°F/ Upright	≥ 11.2	20 @ 7	Figures 4005.2.3.6(1) and 4005.2.3.6(2)	QR/165°F/ Upright	8.0	6 @ 45 (one level of in-racks) or 12 @ 45 (more than one level of in racks)
On-end	Wet	30	25 feet/ 5 barrels	8	SR/286°F/Any	≥ 11.2	50 @ 7	Figures 4005.2.3.6(3), 4005.2.3.6(4) and 4005.2.3.6(5)	QR/165°F/Any	≥ 8.0	6 @ 25 (one level) or 12 @ 25 (more than one level)

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.895 kPa, K-factor of 1 gpm/$psi^{1/2}$ = 14.395 L/min/$bar^{1/2}$, °C = (°F – 32)/1.8.
QR = Quick Response; SR = Standard Response; NA = Not Applicable.

a. Sprinklers shall have a maximum coverage area of 100 square feet.

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FIGURE 4005.2.3.6(1)—IN-RACK SPRINKLER LAYOUT FOR WOODEN BARRELS ON THEIR SIDES (PLAN VIEW)

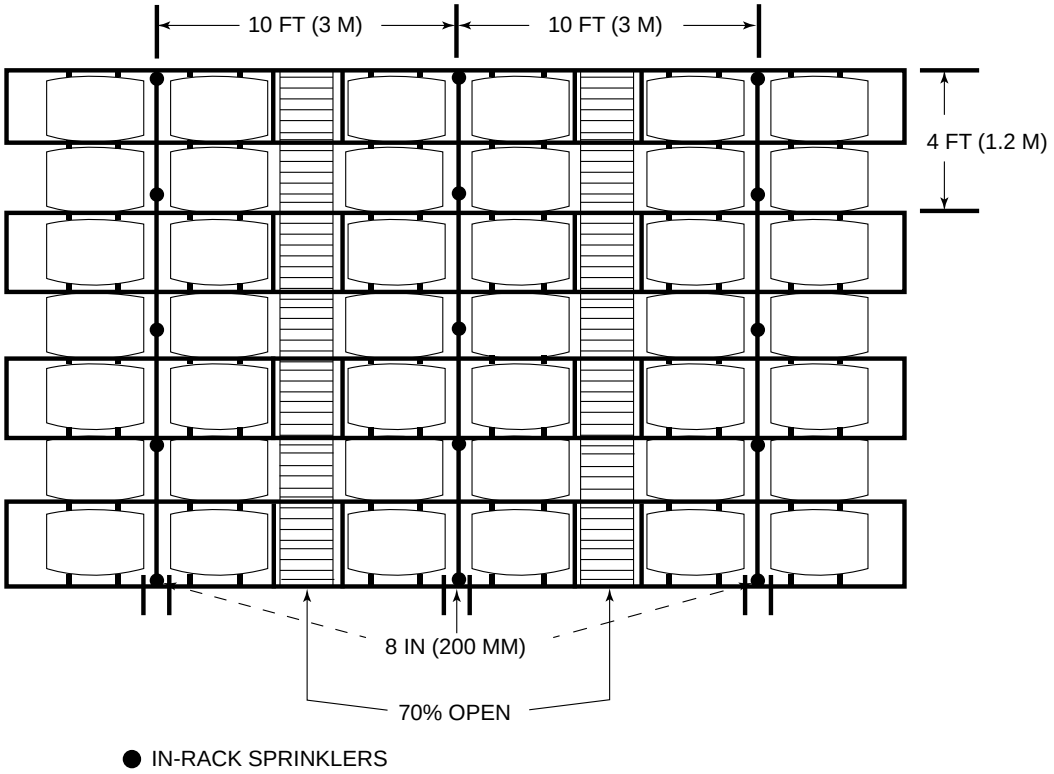

Figure credit: FM Global Property Loss Prevention Data Sheet 7-29

FIGURE 4005.2.3.6(2)—IN-RACK SPRINKLER LAYOUT FOR WOODEN BARRELS ON THEIR SIDES (ELEVATION VIEW)

Figure credit: FM Global Property Loss Prevention Data Sheet 7-29

FIGURE 4005.2.3.6(3)—IN-RACK SPRINKLER LAYOUT FOR SINGLE-ROW RACK OF ON-END WOODEN BARRELS

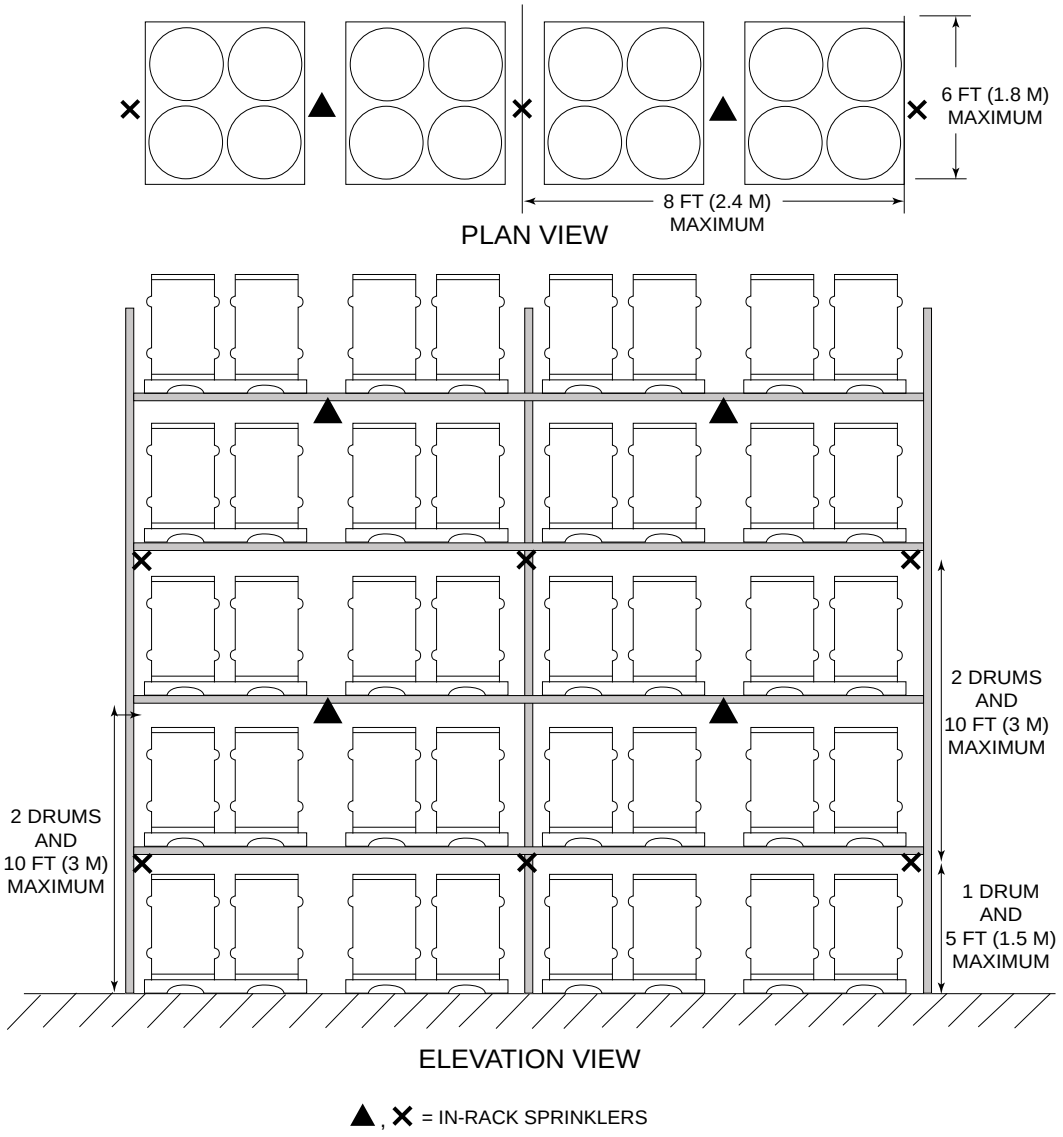

Figure credit: FM Global Property Loss Prevention Data Sheet 7-29

FIGURE 4005.2.3.6(4)—IN-RACK SPRINKLER LAYOUT FOR DOUBLE-ROW RACK OF ON-END WOODEN BARRELS

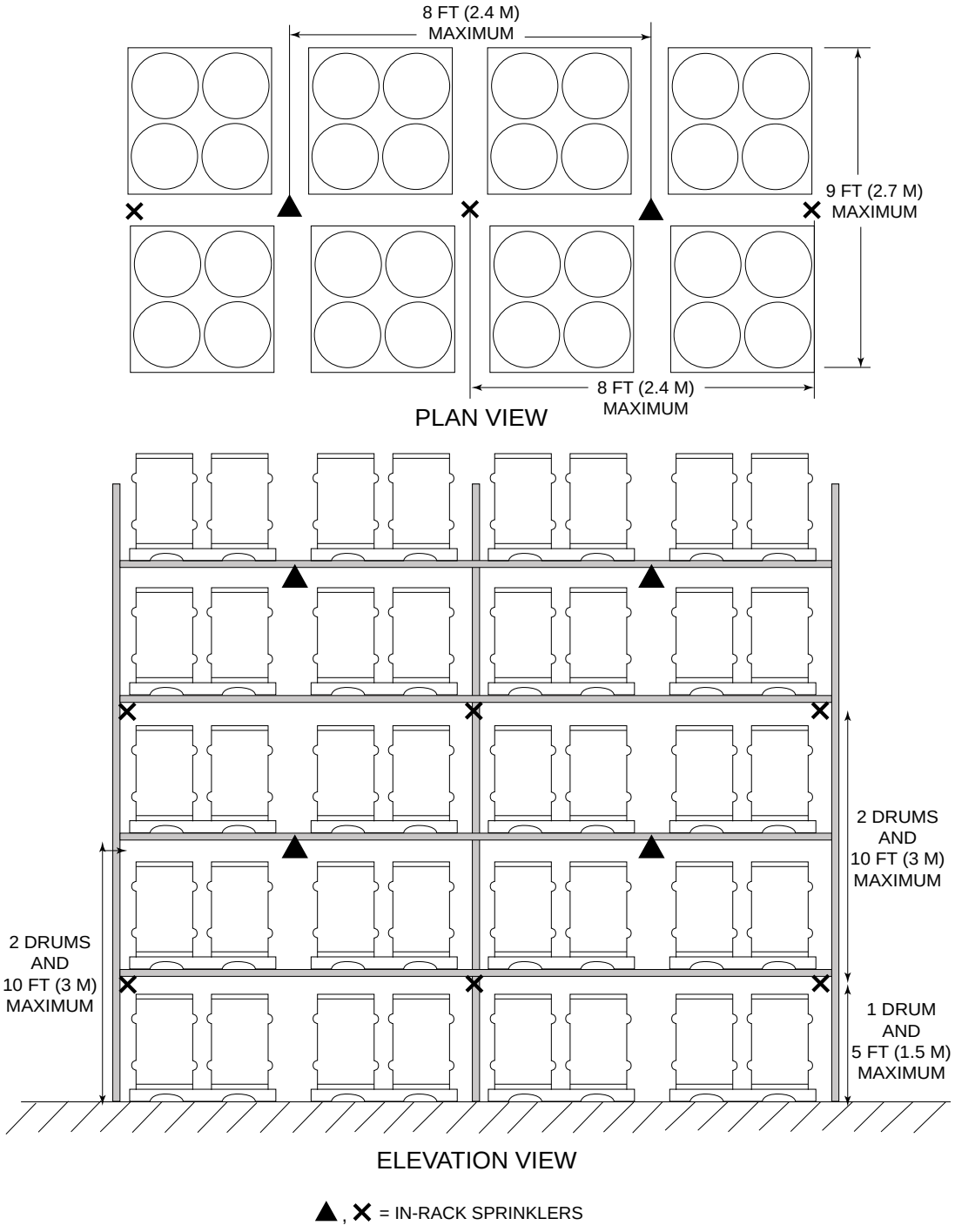

Figure credit: FM Global Property Loss Prevention Data Sheet 7-29

FIGURE 4005.2.3.6(5)—IN-RACK SPRINKLER LAYOUT FOR MULTIPLE-ROW RACK OF ON-END WOODEN BARRELS

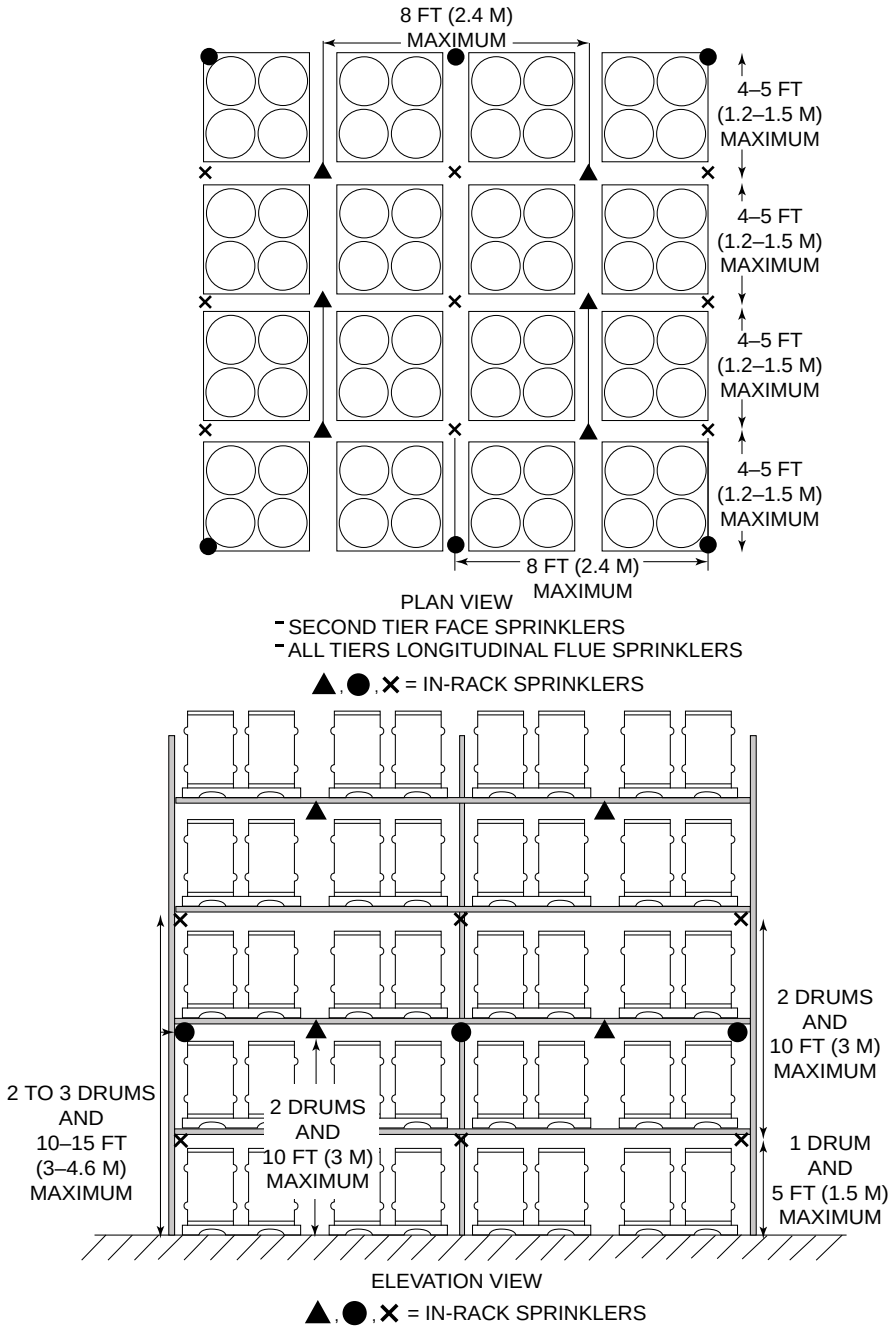

Figure credit: FM Global Property Loss Prevention Data Sheet 7-29

4005.3 Wine with 20 percent or less alcohol content. The storage of wine in barrels with an alcohol content of 20 percent or less shall be protected by an approved automatic sprinkler system installed throughout in accordance with Section 903.3.1.1.

4005.4 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with Section 906.

SECTION 4006—SIGNAGE

4006.1 Hazard identification signs. Unless otherwise exempted by the fire code official, visible hazard identification signs, as specified in NFPA 704 for the specific material contained, shall be placed on stationary containers and above-ground tanks; at entrances to locations where hazardous materials are stored, dispensed, used or handled in quantities requiring a permit; and at specific entrances and locations designated by the fire code official.

4006.1.1 Maintenance and style. Signs and markings required by Section 4006.1 shall not be obscured or removed; shall be in English as a primary language or in symbols allowed by this code; shall be durable; and the size, color and lettering shall be approved.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 41 – TEMPORARY HEATING AND COOKING OPERATIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
[T-19 §325]				X																			
4103.1			X																				
4106 Reserved			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

41

TEMPORARY HEATING AND COOKING OPERATIONS

User notes:

About this chapter: Chapter 41 provides all requirements relative to temporary heating and cooking operations, including mobile food trucks, in a single chapter. During the COVID-19 pandemic, many fire and building officials found that the code requirements surrounding temporary heating and cooking, especially in tents and canopies, were disjointed and often confusing when spread across Chapters 3, 6 and 31. In addition, some types of heating and cooking appliances were not adequately covered. This chapter is intended to facilitate consistent enforcement of temporary heating and cooking operations by making the requirements more straightforward. This chapter does not address temporary heating on construction sites as it was felt that having all requirements for fire safety during construction in the same location was necessary.

SECTION 4101—GENERAL

4101.1 General. The provisions of this chapter shall apply to the use, operation, testing and maintenance of mobile and portable equipment and devices used for temporary heating and cooking. Temporary heating and cooking operations with open flames shall also comply with any additional applicable requirements in Section 308.

Exception: Temporary heating devices used in the course of construction, alteration and demolition of structures shall comply with Section 3304.

4101.2 Permits. Operational permits shall be obtained as set forth in Section 105.5.

4101.3 Listed equipment. Mobile and portable equipment and devices used for temporary heating and cooking shall be listed and labeled. The installation, maintenance and use of equipment and devices shall be in accordance with their listing and the manufacturer's instructions.

4101.4 Operation and maintenance. The building owner or the equipment owner/operator shall operate and maintain the equipment in accordance with the manufacturer's operating instructions and this section.

4101.4.1 Wildfire risk area. Temporary heating and cooking operations shall be in accordance with applicable local wildfire risk area regulations.

4101.4.2 Attendance. Mobile and portable heating and cooking equipment shall be constantly attended while in use and until cooled to a safe temperature.

4101.4.3 Fire extinguishers. Not fewer than one portable fire extinguisher complying with Section 906 with a minimum 4-A rating or other approved on-site fire-extinguishing equipment shall be available for immediate utilization.

4101.5 Electrical heating and cooking equipment. Electrical cooking and heating equipment shall comply with *the California Electrical Code*. **

4101.6 LP-gas. The storage, handling and use of LP-gas and LP-gas equipment shall be in accordance with Sections 4101.6.1 through 4101.6.3.

4101.6.1 General. LP-gas equipment such as containers, tanks, piping, hoses, fittings, valves, tubing and other related components shall be approved and in accordance with Chapter 61 and with the *International Fuel Gas Code*.

[California Code of Regulations, Title 19, Division 1, §325] Liquefied Petroleum Gas.

Liquefied petroleum gas shall not be stored or used in connection with any tent unless the storage containers, equipment, fittings, appliances, placement, use and operation complies with the provisions of California Code of Regulations, Title 8, Article 5, Subchapter 1, Chapter 4.

4101.6.2 Location of containers. LP-gas containers and tanks shall be located outside in accordance with Table 6104.3. Pressure relief devices shall be pointed away from the tent or membrane structure.

4101.6.3 Protection and security. Portable LP-gas containers, tanks, piping, valves and fittings that are located outside and are being used to fuel equipment inside a tent or membrane structure shall be adequately protected to prevent tampering, damage by vehicles or other hazards and shall be located in an approved location. Portable LP-gas containers shall be secured to prevent unauthorized movement.

4101.6.4 Refueling. Exchanging of LP containers shall be conducted in accordance with Chapter 61. Liquid transfer of LP gas shall be in accordance with Chapter 7 of NFPA 58.

4101.7 Oil-fired heaters. Oil-fired cooking and heating equipment shall comply with Section 605 and this chapter.

4101.8 Refueling of flammable and combustible liquid-fueled equipment. Refueling operations for liquid-fueled equipment or devices shall be conducted in accordance with Section 5705 and all of the following:

1. Refueling operations for liquid-fueled equipment or devices shall be conducted by trained personnel in accordance with the manufacturer's instructions and this code.
2. The equipment or device shall be turned off and allowed to cool prior to refueling.
3. Operations shall be conducted in a well-ventilated area at a minimum of 10 feet (3048 mm) from any building or structure.

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4101.9 Cooking operations. Portable cooking equipment using combustible oils or solids shall comply with all of the following:

1. A noncombustible lid shall be immediately available. The lid shall be of sufficient size to cover the cooking well completely.
2. Equipment shall be placed on a noncombustible surface.
3. A portable fire extinguisher for protection appropriate to the cooking media shall be provided at a location approved by the fire code official.

4101.10 Hazard abatement. Operations or conditions deemed unsafe or hazardous by the fire code official shall be abated. Equipment and devices that are modified or damaged and constitute an electrical shock or fire hazard shall not be used.

4101.10.1 Correction of unsafe conditions. The fire code official shall be authorized to require the owner, the owner's authorized agent, operator or user of the equipment to abate unsafe operations or conditions or cause such conditions to be abated or corrected either by removal, repair, rehabilitation, disposal or other approved corrective action in compliance with this code.

SECTION 4102—PORTABLE ELECTRIC HEATING APPLIANCES

** **4102.1 Portable, electric space heaters.** Where not prohibited by other sections of this code, portable, electric space heaters shall be permitted to be used in all occupancies in accordance with Sections 4102.1.1 through 4102.1.5.

4102.1.1 Listed and labeled. Only listed and labeled portable, electric space heaters shall be used.

4102.1.2 Power supply. Portable, electric space heaters shall be plugged directly into an approved receptacle.

4102.1.3 Extension cords. Portable, electric space heaters shall not be plugged into extension cords.

4102.1.4 Prohibited areas. Portable, electric space heaters shall not be operated within 3 feet (914 mm) of any combustible materials. Portable, electric space heaters shall be operated only in locations for which they are listed.

4102.1.5 Group I-2 occupancies and ambulatory care facilities. Where used in Group I-2 and ambulatory care facilities, portable, electric space heaters shall be limited to those having a heating element that cannot exceed a temperature of 212°F (100°C), and such heaters shall only be used in nonsleeping staff and employee areas.

SECTION 4103—PORTABLE FUEL-FIRED HEATING APPLIANCES

** **4103.1 Portable unvented heaters.** Portable unvented fuel-fired heating equipment shall be prohibited in occupancies in Groups A, E, I, R-1, R-2, *R-2.1, R-2.2,* R-3*, R-3.1* and R-4 and ambulatory care facilities.

Exceptions:

1. Portable unvented fuel-fired heaters listed and labeled in accordance with UL 647 are permitted to be used in one- and two-family dwellings, where operated and maintained in accordance with the manufacturer's instructions.
2. Portable outdoor gas-fired heating appliances in accordance with Section 4103.1.2.

4103.1.1 Prohibited locations. Unvented fuel-fired heating equipment shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms or storage closets.

4103.1.2 Portable outdoor gas-fired heating appliances. Portable gas-fired heating appliances located outdoors shall be in accordance with Sections 4103.1.2.1 through 4103.1.2.3.4.

4103.1.2.1 Location. Portable outdoor gas-fired heating appliances shall be used and located in accordance with Sections 4103.1.2.1.1 through 4103.1.2.1.4.

4103.1.2.1.1 Prohibited locations. The storage or use of portable outdoor gas-fired heating appliances is prohibited in any of the following locations:

1. Inside of any occupancy where connected to the fuel gas container.
2. Inside of tents, canopies and membrane structures.
3. On exterior balconies.

   Exception: As permitted in Chapter 61.

4103.1.2.1.2 Clearance to buildings. Portable outdoor gas-fired heating appliances shall be located not less than 5 feet (1524 mm) from buildings.

4103.1.2.1.3 Clearance to combustible materials. Portable outdoor gas-fired heating appliances shall not be located beneath, or closer than 5 feet (1524 mm) to combustible decorations and combustible overhangs, awnings, sunshades or similar combustible attachments to buildings.

4103.1.2.1.4 Proximity to exits. Portable outdoor gas-fired heating appliances shall not be located within 5 feet (1524 mm) of exits or exit discharges.

4103.1.2.2 Use and operation. Portable outdoor gas-fired heating appliances shall be used and operated in accordance with Sections 4103.1.2.2.1 through 4103.1.2.2.4.

4103.1.2.2.1 Listing and approval. Only listed and approved portable outdoor gas-fired heating appliances utilizing a fuel gas container that is integral to the appliance shall be used. Portable outdoor gas-fired heating appliances shall be listed and labeled in accordance with ANSI Z83.26/CSA 2.37.

4103.1.2.2.2 Use and maintenance. Portable outdoor gas-fired heating appliances shall be used and maintained in accordance with the manufacturer's instructions.

4103.1.2.2.3 Tip-over switch. Portable outdoor gas-fired heating appliances shall be equipped with a tilt or tip-over switch that automatically shuts off the flow of gas if the appliance is tilted more than 15 degrees (0.26 rad) from the vertical.

4103.1.2.2.4 Guard against contact. The heating element or combustion chamber of portable outdoor gas-fired heating appliances shall be permanently guarded so as to prevent accidental contact by persons or material.

4103.1.2.3 Gas containers. Fuel gas containers for portable outdoor gas-fired heating appliances shall comply with Sections 4103.1.2.3.1 through 4103.1.2.3.4.

4103.1.2.3.1 Approved containers. Only approved DOTn or ASME gas containers shall be used.

4103.1.2.3.2 Container replacement. Replacement of fuel gas containers in portable outdoor gas-fired heating appliances shall not be conducted while the public is present.

4103.1.2.3.3 Container capacity. The maximum individual capacity of gas containers used in connection with portable outdoor gas-fired heating appliances shall not exceed 20 pounds (9 kg).

4103.1.2.3.4 Indoor storage prohibited. Gas containers shall not be stored inside of buildings except in accordance with Section 6109.9.

SECTION 4104—PORTABLE FUEL-FIRED COOKING APPLIANCES

4104.1 Portable fuel-fired cooking appliances. Portable fuel-fired cooking appliances shall be permitted to be used in all occupancies in accordance with this section.

4104.2 Open-flame cooking devices. Charcoal burners and other open-flame cooking devices shall not be operated on combustible balconies or within 10 feet (3048 mm) of combustible construction. **

Exceptions:

1. One- and two-family dwellings.
2. Where buildings, balconies and decks are protected by an automatic sprinkler system.
3. LP-gas cooking devices having LP-gas container with a water capacity not greater than $2^1/_2$ pounds [nominal 1 pound (0.454 kg) LP-gas capacity].

4104.3 Indoor cooking. Portable fuel-fired cooking appliances used indoors shall not be located within 10 feet (3048 mm) of exits or combustible materials.

4104.4 Cooking operations. Cooking that produces sparks or grease-laden vapors shall not be performed within 10 feet (3048 mm) of a tent or membrane structure except where the following conditions are met:

1. Cooking devices shall be isolated from the public.
2. Cooking devices shall be maintained and used according to the manufacturer's instructions.

Exception: Designated cooking tents with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

4104.5 Separation of cooking tents. Tents with sidewalls or drops where cooking is performed shall be separated from other non-cooking tents or membrane structures by not less than 10 feet (3048 mm).

Exception: Small tents limited to 100 square feet (9.3 m^2) that are accessory to the cooking operations of the cooking tent and are not occupied by the public.

4104.5.1 Groups of cooking tents. Cooking tents shall be permitted to be placed side by side where the following conditions are met:

1. The area of the cooking tents has a maximum area of 700 square feet (65 m^2).
2. Each grouping of tents shall have a fire break clearance of at least 12 feet (3658 mm).
3. A fire access aisle separating rows of cooking tents has a minimum width of 16 feet (4877 mm) clear.

4104.6 Operations. Operations such as warming of foods, cooking demonstrations and similar operations that use solid flammables, butane or other similar devices that do not pose an ignition hazard, shall be approved.

SECTION 4105—PORTABLE ELECTRIC COOKING APPLIANCES

4105.1 Portable electric cooking appliances. Portable electric cooking appliances shall be permitted to be used in all occupancies in accordance with Sections 4105.1.1 through 4105.1.5.

4105.1.1 Listed and labeled. Portable electric cooking appliances shall be listed and labeled and shall be used in accordance with their listing and the manufacturer's instructions.

4105.1.2 Power supply. Portable electric cooking appliances shall be plugged directly into an approved receptacle or connected to a relocatable power tap rated 20 amps (2400 W).

4105.1.3 Extension cords. Portable electric cooking appliances shall not be plugged into extension cords.

4105.1.4 Temporary connections. Where portable electric cooking appliances are used for temporary operations, the appliance shall be disconnected from the power supply when not in use.

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4105.1.5 Prohibited areas. Portable electric cooking appliances shall not be operated within 3 feet (914 mm) of any combustible materials or in Group H occupancies. Portable electric cooking appliances shall be operated only in locations for which they are listed.

SECTION 4106—*RESERVED*

CHAPTERS

42–47 RESERVED

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 48 – MOTION PICTURE AND TELEVISION PRODUCTION STUDIO SOUND STAGES, APPROVED PRODUCTION FACILITIES AND PRODUCTION LOCATIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

48

MOTION PICTURE AND TELEVISION PRODUCTION STUDIO SOUND STAGES, APPROVED PRODUCTION FACILITIES AND PRODUCTION LOCATIONS

SECTION 4801—GENERAL

4801.1 Scope. *Production studios, sound stages, approved production facilities and production locations used by the entertainment industry for the purpose of motion picture, television and commercial production shall be in accordance with the provisions of this article.*

4801.2 Purpose. *The purpose of this article is to establish minimum requirements that will provide a reasonable degree of safety from fire, panic and explosion. Buildings and structures defined herein shall be in accordance with this article.*

4801.3 DEFINITIONS.

APPROVED FIRE WATCH. *Individuals provided with at least one approved means for notification of the fire department and their only duty shall be to perform constant patrols of the protected premises and keep watch for fires.*

APPROVED PRODUCTION FACILITY. *An existing building, or portion of a building, or a group of buildings altered for use by the entertainment industry for the purpose of motion picture, television and commercial production.*

PLATFORM. *Part of a set, which is a floor or horizontal surface raised above stage floor level.*

PRODUCTION LOCATION. *Any area or facility outside a production studio, approved production facility or sound stage used by the entertainment industry for the purpose of motion picture, television and commercial production.*

PRODUCTION STUDIO. *A building, portion of a building, or a group of buildings designed and constructed for use by the entertainment industry for the purpose of motion picture, television and commercial production.*

SET. *A structure built or assembled for the purpose of motion picture, television and commercial production.*

SOUND STAGE. *A building or portion of a building usually insulated from outside noise and natural light for use by the entertainment industry for the purpose of motion picture, television and commercial production.*

SECTION 4802—OCCUPANCY CLASSIFICATION

4802.1 Live audience stages. *Production facilities, sound stages and approved production studios with live audience stages shall be classified as Group A-1 occupancy in accordance with the California Building Code.*

4802.2 All other stages. *Production studios, sound stages and approved production facilities without live audience stages shall be classified as Group F-1 occupancy in accordance with the California Building Code.*

Note: *Sections 4803 through 4810 apply only to studio sound stages and approved production facilities.*

SECTION 4803—REQUIRED PERMITS

4803.1 Change in use. *A permit from the fire code official shall be obtained any time a change in use or occupancy is intended by the owner (e.g., for live audience shows, wrap parties).*

4803.2 Additional permits. *A permit shall be required for:*

a) Use of pyrotechnic special effects.
b) Open flames.
c) Flammable or combustible liquids, gases and dust.
d) Hot work.
e) Presence of motor vehicles within a building.
f) Any additional permits as required by the fire code official.

4803.3 Live audiences. *A permit shall be required for seating arrangements of all live audience stages.*

SECTION 4804—GENERAL REQUIREMENTS

4804.1 Housekeeping. *Provisions of this part shall maintain proper housekeeping in accordance with Chapter 3.*

4804.2 Aisles. *Perimeter aisles within the sound stage and approved production facility shall be provided. Aisles required by this section shall have a minimum width of 4 feet (1219 mm). See Chapter 10 for maintenance requirements. Aisles required by this section shall have a minimum clear unobstructed height of 7 feet (2134 mm).*

4804.3 Travel distance. *The maximum travel distance to any exit within the sound stage and approved production facility shall be 150 feet (45 720 mm).*

4804.4 Exit doors. *Exit doors shall be equipped with panic hardware and swing in the direction of exit travel.*

4804.5 Exit signs. *Illuminated exit signs shall be installed in accordance with the California Building Code.*

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4804.6 Exit illumination. *Exit illumination shall be provided in accordance with the California Building Code. In the event of power failure, exit path illumination shall be automatically provided by an approved emergency back-up system.*

4804.7 Exit obstructions. *All means of egress shall be maintained in accordance with the provisions of Chapter 10, Section 1005.1.*

4804.8 Foam plastics. *All foam plastics shall meet the requirements of Chapter 8, Sections 807.5.1.5 and 807.5.7.*

4804.9 Decorative materials. *Drapes, drops, cut greens, etc., shall meet the flame retardant requirements of California Code of Regulations, Title 19, Division 1, Chapters 5 and 8, Sections 807.5.1.5 and 807.5.7.*

SECTION 4805—FIRE-EXTINGUISHING SYSTEMS

4805.1 Existing sound stages and approved production facilities. *All existing sound stages and approved production facilities equipped with an automatic fire sprinkler system shall be maintained in accordance with the provisions in Chapter 9.*

4805.2 New sound stages. *All new sound stages shall be equipped with an approved automatic fire sprinkler system. The system shall be installed in accordance with the provisions in Chapter 9 and shall meet the minimum design requirements of an Extra Hazard, Group 2 system.*

4805.3 Solid-ceiling sets and platforms. *All interior solid-ceiling sets over 600 square feet (55.7 m^2) in area, and platforms (when provided) over 600 square feet (55.7 m^2) in area and which exceed 3 feet (914 mm) in height shall be protected by one of the following:*

1. *An approved and listed heat detector system. Heat detectors shall be spaced 30 feet (9144 mm) on center or as required by the manufacturer's installation instructions. Detectors shall be connected to an approved and listed central, proprietary or remote station service or a local alarm, which will give an audible signal at a constantly attended location. Such system shall be installed in accordance with Chapter 9.*
2. *The ceiling shall be positioned to allow for the operation of the building's automatic fire sprinkler system after rehearsal, videotaping, filming or broadcasting of programs has been completed for the day.*
3. *An approved fire watch.*
4. *Special hazards shall be reviewed by the fire code official (see Additional Fire Protection Systems, Section 901.4.3).*

SECTION 4806—FIRE DETECTION EQUIPMENT

4806.1 Fire alarm control units. *Fire alarm control units shall be California State Fire Marshal listed and shall be utilized in accordance with their listing. Control units may be temporarily supported by sets, platforms or pedestals.*

4806.2 Heat detectors. *Heat detection required by this article shall be defined as a portable system as it is intended to be reinstalled when platforms or sets are changed.*

Heat detectors may be secured to standard outlet boxes which may be temporarily supported by sets, platforms or pedestals.

Heat detectors shall be provided for solid-ceiling sets and platforms where required by Sections 4805.3 and 4811.14.

SECTION 4807—FIRE SAFETY OFFICERS

4807.1 *Where permits are required by the Fire Code, a requirement for standby fire safety officers shall be determined by the fire code official on a case-by-case basis. Standby fire safety officers shall not be required when the provisions of this article are met.*

SECTION 4808—ELECTRICAL REQUIREMENTS

4808.1 General. *All electrical equipment including lighting, cabling and temporary power, such as portable generators, shall be maintained in good working order and shall comply with the provisions of the California Electrical Code.*

4808.2 Lighting and power requirements. *A studio sound stage and approved production facility shall be provided with a minimum of 35 watts per square foot of permanently installed power dedicated for the distribution of production lighting and power. Mobile generators may be utilized for auxiliary power.*

4808.3 Distribution. *Distribution equipment shall be designed for sound stage use. The wiring to such equipment shall be considered permanent and shall comply with applicable provisions of the California Electrical Code. Temporary feeders shall not be tapped from panelboards and switchboards where deadfront covers have to be removed.*

4808.4 Installations. *Permanent or temporary electrical installations shall be installed in accordance with the California Electrical Code and this code. Such equipment shall not obstruct exits, means of egress or fire department access, unless approved by the fire code official.*

4808.5 Generators. *Portable, mobile or stationary power-generating equipment may be used to supplement building electrical power for temporary use. Equipment shall be located at a pre-designated location, as approved by the fire code official.*

Temporary auxiliary power cables supplied from mobile generators or adjacent buildings may pass through exterior walls and interior fire-resistive assemblies provided an approved through-penetration fire-stop system is utilized for protection of the opening.

SECTION 4809—MECHANICAL EQUIPMENT

4809.1 Existing equipment. *All mechanical equipment used as part of the building ventilation system shall be maintained in good working order and shall comply with the provisions of the California Mechanical Code.*

4809.2 Auxiliary equipment. *All auxiliary heating, ventilation and air-conditioning equipment shall be approved and listed for the intended use. Flexible duct, if utilized, shall be noncombustible. Such auxiliary equipment shall not obstruct exits, means of egress or fire department access.*

SECTION 4810—DESIGN REQUIREMENTS

4810.1 General. *The fire code official shall be provided with certification that approved production facilities and studio sound stages will sustain the anticipated loads of sets, props or other temporary modifications.*

Where the anticipated loads exceed the design criteria for an approved production facility and studio sound stage, the building or portions thereof shall be modified for the additional loads.

SECTION 4811—PRODUCTION LOCATIONS

4811.1 General. *This chapter shall apply to production locations.*

4811.2 Permits. *A permit shall be obtained, unless waived by the fire code official for any of the activities that follow:*

- *a) Use of pyrotechnic special effects, see Section 3307.1 and California Code of Regulations, Title 19, Division 1, Chapter 6.*
- *b) Open flames.*
- *c) Flammable or combustible liquids, gases and dust.*
- *d) Hot work.*
- *e) Presence of motor vehicles within a building.*
- *f) Tents and canopies, see Chapter* 31.
- *g) Any additional permits as required by the agency having jurisdiction (AHJ).*

4811.3 Pyrotechnic special effects and open flames. *The use of pyrotechnic special effects and open flames shall be subject to the approval of the fire code official.*

4811.4 Standby fire personnel. *A requirement for standby fire safety officers shall be determined by the fire code official on a case-by-case basis.*

4811.5 Foamed plastic materials. *All foam plastics shall meet the requirements of Chapter 8, Sections 807.5.1.5 and 807.5.7.*

4811.6 Smoking. *When the fire code official determines that hazardous conditions necessitate controlled use of smoking materials, smoking may be prohibited or limited to designated smoking areas.*

4811.7 Structural loads. *Sets, scenery and other equipment shall not impact the structural integrity of a building or structure. Consultation with a building official or structural engineer may be required.*

4811.8 Electrical requirements.

4811.8.1 General. *All electrical equipment including lighting, cabling and temporary power, such as portable generators, shall be maintained in good working order and shall comply with the provisions of the California Electrical Code.*

4811.8.2 Distribution. *Temporary feeders shall not be tapped from panelboards and switchboards where deadfront covers have to be removed.*

4811.8.3 Installations. *Electrical installations shall be installed in accordance with the California Electrical Code. Such equipment shall not obstruct exits, means of egress or fire department access, unless approved by the fire code official.*

4811.8.4 Generators. *Portable, mobile or stationary power-generating equipment may be used to supplement building electrical power for temporary use. Equipment shall be placed in a location acceptable to the fire code official.*

4811.9 Fire department access. *Required emergency vehicle access shall be maintained. Any deviations are subject to approval by the fire code official.*

4811.10 Means of egress. *The production location shall be provided with means of egress appropriate for the intended use as approved by the fire code official.*

4811.11 Fire protection systems and equipment. *Functional fire protection systems and equipment shall be maintained in an operable condition, unless approved by the fire code official. Disconnecting or altering of fire protection systems and/or equipment shall be prohibited, unless otherwise approved by the fire code official with alternate means of protection provided.*

4811.12 Fire hydrants and fire appliances. *Hydrants, standpipes and fire department connections (FDC) shall not be obstructed, blocked or rendered inoperable in accordance with Chapter 9, unless approved by the fire code official.*

4811.13 Fire extinguishers. *Approved fire extinguishers shall be provided as required by the fire code official.*

4811.14 Solid-ceiling sets and platforms. *In buildings with existing fire protection systems and where production intends to construct solid-ceiling sets over 600 square feet (55.7 m^2) in area, and platforms over 600 square feet (55.7 m^2) in area and which exceed 3 feet (914 mm) in height, such buildings shall be protected by one of the following:*

1. *An approved and listed heat detector system. Heat detectors shall be spaced 30 feet (9144 mm) on center or as required by the manufacturer's installation instructions. Detectors shall be connected to an approved and listed central, proprietary or remote station service or a local alarm, which will give an audible signal at a constantly attended location. Such system shall be installed in accordance with Chapter 9.*

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2. *The ceiling shall be positioned to allow for the operation of the building's automatic fire sprinkler system after rehearsal, video-taping, filming or broadcasting of programs has been completed for the day.*
3. *An approved fire watch.*
4. *Special hazards shall be reviewed by the enforcing agency (see additional fire protection systems, Section 901.4.3).*

4811.15 Buildings without fire protection systems. *Special hazards shall be reviewed by the fire code official (see special hazards Section 901.4.4).*

CHAPTER

49

REQUIREMENTS FOR WILDLAND-URBAN INTERFACE FIRE AREAS

User notes:

Requirements for wildland-urban interface areas are now located in Part 7, California Wildland-Urban Interface Code. See Section 102.13 Wildland-Urban Interface.

The provisions of Part 7, California Wildland-Urban Interface Code shall apply to buildings and structures located in the wildland-urban interface (WUI) or Fire Hazard Severity Zone.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 50 – HAZARDOUS MATERIALS—GENERAL PROVISIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
5001.5.1			X																				
5001.5.2			X																				
5003.1.1			X																				
Table 5003.1.1(1)			X																				
Table 5003.1.1(2)			X																				
5003.10.2			X																				
5003.10.2.1			X																				
5003.10.2.2			X																				
5003.10.4			X																				
5003.10.4.1			X																				
5003.10.4.2			X																				
5003.10.4.3			X																				
5003.10.4.4			X																				
5003.10.5 – 5003.10.6.2			X																				
5003.11			X																				
5004.3.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER
50
HAZARDOUS MATERIALS—GENERAL PROVISIONS

User notes:

About this chapter: Chapter 50 contains the general requirements for all hazardous materials in all occupancies. Hazardous materials are defined as those that pose an unreasonable risk to the health and safety of operating or emergency personnel, the public and the environment if not properly controlled during handling, storage, manufacture, processing, packaging, use, disposal or transportation. The general provisions of this chapter are intended to be companion provisions with the specific requirements of Chapters 51 through 67 regarding a given hazardous material. Also, Sections 414 and 415 of the *California Building Code* contain construction requirements related to the storage and use of such materials.

SECTION 5001—GENERAL

5001.1 Scope. Prevention, control and mitigation of dangerous conditions related to storage, dispensing, use and handling of hazardous materials shall be in accordance with this chapter.

This chapter shall apply to all hazardous materials, including those materials regulated elsewhere in this code, except that where specific requirements are provided in other chapters, those specific requirements shall apply in accordance with the applicable chapter. Where a material has multiple hazards, all hazards shall be addressed.

Exceptions:

1. In retail or wholesale sales occupancies, medicines, foodstuff, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
2. Alcoholic beverages in retail or wholesale sales occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
4. The off-site transportation of hazardous materials where in accordance with Department of Transportation (DOTn) regulations.
5. Building materials not otherwise regulated by this code.
6. Refrigeration systems (see Section 608).
7. Stationary storage battery systems regulated by Section 1207.
8. The display, storage, sale or use of fireworks and explosives in accordance with Chapter 56.
9. Corrosives utilized in personal and household products in the manufacturer's original consumer packaging in Group M occupancies.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. The use, storage or both of dispensers containing alcohol-based hand rubs classified as Class I or II liquids where in accordance with Section 5705.5.
12. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
13. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, Chapter 57 applies.
14. Storage and display of aerosol products complying with Chapter 51.
15. Storage and use of flammable or combustible liquids that do not have a fire point when tested in accordance with ASTM D92, not otherwise regulated by this code.
16. Flammable or combustible liquids with a flash point greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion, not otherwise regulated by this code.
17. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.

5001.1.1 Waiver. The provisions of this chapter are waived where the fire code official determines that such enforcement is preempted by other codes, statutes or ordinances. The details of any action granting such a waiver shall be recorded and entered in the files of the code enforcement agency.

5001.2 Material classification. Hazardous materials are those chemicals or substances defined as such in this code. Definitions of hazardous materials shall apply to all hazardous materials, including those materials regulated elsewhere in this code.

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5001.2.1 Mixtures. Mixtures shall be classified in accordance with hazards of the mixture as a whole. Mixtures of hazardous materials shall be classified in accordance with nationally recognized reference standards; by an approved qualified organization, individual, or Safety Data Sheet (SDS); or by other approved methods.

5001.2.2 Hazard categories. Hazardous materials shall be classified according to hazard categories. The categories include materials regulated by this chapter and materials regulated elsewhere in this code.

5001.2.2.1 Physical hazards. The material categories listed in this section are classified as physical hazards. A material with a primary classification as a physical hazard can also pose a health hazard.

1. Explosives and blasting agents.
2. Combustible liquids.
3. Flammable solids, liquids and gases.
4. Organic peroxide solids or liquids.
5. Oxidizer, solids or liquids.
6. Oxidizing gases.
7. Pyrophoric solids, liquids or gases.
8. Unstable (reactive) solids, liquids or gases.
9. Water-reactive materials solids or liquids.
10. Cryogenic fluids.

5001.2.2.2 Health hazards. The material categories listed in this section are classified as health hazards. A material with a primary classification as a health hazard can also pose a physical hazard.

1. Highly toxic and toxic materials.
2. Corrosive materials.

5001.3 Performance-based design alternative. Where approved by the fire code official, buildings and facilities where hazardous materials are stored, used or handled shall be permitted to comply with this section as an alternative to compliance with the other requirements set forth in this chapter and Chapters 51 through 67.

5001.3.1 Objective. The objective of Section 5001.3 is to protect people and property from the consequences of unauthorized discharge, fires or explosions involving hazardous materials.

5001.3.2 Functional statements. Performance-based design alternatives are based on the following functional statements:

1. Provide safeguards to minimize the risk of unwanted releases, fires or explosions involving hazardous materials.
2. Provide safeguards to minimize the consequences of an unsafe condition involving hazardous materials during normal operations and in the event of an abnormal condition.

5001.3.3 Performance requirements. Where safeguards, systems, documentation, written plans or procedures, audits, process hazards analysis, mitigation measures, engineering controls or construction features are required by Sections 5001.3.3.1 through 5001.3.3.18, the details of the design alternative shall be subject to approval by the fire code official. The details of actions granting the use of the design alternatives shall be recorded and entered in the files of the jurisdiction.

5001.3.3.1 Properties of hazardous materials. The physical- and health-hazard properties of hazardous materials on-site shall be known and shall be made readily available to employees, neighbors and the fire code official.

5001.3.3.2 Reliability of equipment and operations. Equipment and operations involving hazardous materials shall be designed, installed and maintained to ensure that they reliably operate as intended.

5001.3.3.3 Prevention of unintentional reaction or release. Safeguards shall be provided to minimize the risk of an unintentional reaction or release that could endanger people or property.

5001.3.3.4 Spill mitigation. Spill containment systems or means to render a spill harmless to people or property shall be provided where a spill is determined to be a plausible event and where such an event would endanger people or property.

5001.3.3.5 Ignition hazards. Safeguards shall be provided to minimize the risk of exposing combustible hazardous materials to unintended sources of ignition.

5001.3.3.6 Protection of hazardous materials. Safeguards shall be provided to minimize the risk of exposing hazardous materials to a fire or physical damage whereby such exposure could endanger or lead to the endangerment of people or property.

5001.3.3.7 Exposure hazards. Safeguards shall be provided to minimize the risk of and limit damage from a fire or explosion involving explosive hazardous materials whereby such fire or explosion could endanger or lead to the endangerment of people or property.

5001.3.3.8 Detection of gas or vapor release. Where a release of hazardous materials gas or vapor would cause immediate harm to persons or property, means of mitigating the dangerous effects of a release shall be provided.

5001.3.3.9 Reliable power source. Where a power supply is relied on to prevent or control an emergency condition that could endanger people or property, the power supply shall be from a reliable source.

5001.3.3.10 Ventilation. Where ventilation is necessary to limit the risk of creating an emergency condition resulting from normal or abnormal operations, means of ventilation shall be provided.

5001.3.3.11 Process hazard analyses. Process hazard analyses shall be conducted to ensure reasonably the protection of people and property from dangerous conditions involving hazardous materials.

5001.3.3.12 Prestartup safety review. Written documentation of prestartup safety review procedures shall be developed and enforced to ensure that operations are initiated in a safe manner. The process of developing and updating such procedures shall involve the participation of affected employees.

5001.3.3.13 Operating and emergency procedures. Written documentation of operating procedures and procedures for emergency shutdown shall be developed and enforced to ensure that operations are conducted in a safe manner. The process of developing and updating such procedures shall involve the participation of affected employees.

5001.3.3.14 Management of change. A written plan for management of change shall be developed and enforced. The process of developing and updating the plan shall involve the participation of affected employees.

5001.3.3.15 Emergency plan. A written emergency plan shall be developed to ensure that proper actions are taken in the event of an emergency, and the plan shall be followed if an emergency condition occurs. The process of developing and updating the plan shall involve the participation of affected employees.

5001.3.3.16 Accident procedures. Written procedures for investigation and documentation of accidents shall be developed, and accidents shall be investigated and documented in accordance with these procedures.

5001.3.3.17 Consequence analysis. Where an accidental release of hazardous materials could endanger people or property, either on- or off-site, an analysis of the expected consequences of a plausible release shall be performed and utilized in the analysis and selection of active and passive hazard mitigation controls.

5001.3.3.18 Safety audits. Safety audits shall be conducted on a periodic basis to verify compliance with the requirements of this section.

5001.4 Retail and wholesale storage and display. For retail and wholesale storage and display of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in Group M occupancies and storage in Group S occupancies, see Section 5003.11.

5001.5 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

Where required by the fire code official, permittees shall apply for approval to permanently close a storage, use or handling facility. Such application shall be submitted not less than 30 days prior to the termination of the storage, use or handling of hazardous materials. The fire code official is authorized to require that the application be accompanied by an approved facility closure plan in accordance with Section 5001.6.3.

5001.5.1 Hazardous Materials Management Plan *(HMMP)*. Where required by the fire code official, an application for a permit shall include a Hazardous Materials Management Plan (HMMP). The HMMP shall include a facility site plan designating the following:

1. Access to each storage and use area.
2. Location of emergency equipment.
3. Location where liaison will meet emergency responders.
4. Facility evacuation meeting point locations.
5. The general purpose of other areas within the building.
6. Location of all above-ground and underground tanks and their appurtenances including, but not limited to, sumps, vaults, below-grade treatment systems and piping.
7. The hazard classes in each area.
8. Locations of all control areas and Group H occupancies.
9. Emergency exits.

[For SFM] The HMMP shall comply with Health and Safety Code, Chapter 6.95, Sections 25500 through 25545, and Title 19, Division 2, Chapter 4.

5001.5.2 Hazardous Materials Inventory Statement (HMIS). Where required by the fire code official, an application for a permit shall include an HMIS, such as Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III, Tier II Report or other approved statement. The HMIS shall include the following information:

1. Product name.
2. Component.
3. Chemical Abstract Service (CAS) number.
4. Location where stored or used.
5. Container size.
6. Hazard classification.
7. Amount in storage.
8. Amount in use-closed systems.
9. Amount in use-open systems.

[For SFM] The HMIS shall comply with Health and Safety Code, Chapter 6.95, Sections 25500 through 25545, and Title 19, Division 2, Chapter 4.

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5001.6 Facility closure. Facilities shall be placed out of service in accordance with Sections 5001.6.1 through 5001.6.3.

5001.6.1 Temporarily out-of-service facilities. Facilities that are temporarily out of service shall continue to maintain a permit and be monitored and inspected.

5001.6.2 Permanently out-of-service facilities. Facilities for which a permit is not kept current or is not monitored and inspected on a regular basis shall be deemed to be permanently out of service and shall be closed in an approved manner. Where required by the fire code official, permittees shall apply for approval to close permanently storage, use or handling facilities. The fire code official is authorized to require that such application be accompanied by an approved facility closure plan in accordance with Section 5001.6.3.

5001.6.3 Facility closure plan. Where a facility closure plan is required in accordance with Section 5001.5 to terminate storage, dispensing, handling or use of hazardous materials, it shall be submitted to the fire code official not less than 30 days prior to facility closure. The plan shall demonstrate that hazardous materials that are stored, dispensed, handled or used in the facility will be transported, disposed of or reused in a manner that eliminates the need for further maintenance and any threat to public health and safety.

SECTION 5002—DEFINITIONS

5002.1 Definitions. The following terms are defined in Chapter 2:

BOILING POINT.
CEILING LIMIT.
CHEMICAL.
CHEMICAL NAME.
CLOSED CONTAINER.
CONTAINER.
CONTROL AREA.
CYLINDER.
DAY BOX.
DEFLAGRATION.
DESIGN PRESSURE.
DETACHED BUILDING.
DISPENSING.
EXCESS FLOW CONTROL.
EXHAUSTED ENCLOSURE.
EXPLOSION.
FLAMMABLE VAPORS OR FUMES.
GAS CABINET.
GAS ROOM.
HANDLING.
HAZARDOUS MATERIALS.
HEALTH HAZARD.
IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH).
INCOMPATIBLE MATERIALS.
LIQUID.
LOWER EXPLOSIVE LIMIT (LEL).
LOWER FLAMMABLE LIMIT (LFL).
MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA.
NORMAL TEMPERATURE AND PRESSURE (NTP).
OUTDOOR CONTROL AREA.
PERMISSIBLE EXPOSURE LIMIT (PEL).
PESTICIDE.
PHYSICAL HAZARD.
PRESSURE VESSEL.
SAFETY CAN.
SAFETY DATA SHEET (SDS).
SECONDARY CONTAINMENT.
SEGREGATED.
SOLID.
STORAGE, HAZARDOUS MATERIALS.

SYSTEM.
TANK, ATMOSPHERIC.
TANK, PORTABLE.
TANK, STATIONARY.
TANK VEHICLE.
UNAUTHORIZED DISCHARGE.
USE (MATERIAL).
VAPOR PRESSURE.

SECTION 5003—GENERAL REQUIREMENTS

5003.1 Scope. The storage, use and handling of all hazardous materials shall be in accordance with this section.

5003.1.1 Maximum allowable quantity per control area. The maximum allowable quantity per control area shall be as specified in Tables 5003.1.1(1) through 5003.1.1(4).

Exception: *Medical gases utilized for patient care within patient areas of a Group I-2 occupancy when the applicable requirements of NFPA 99 Chapter 5 and Chapter 11 have been met.*

For retail and wholesale storage and display in Group M occupancies and Group S storage, see Section 5003.11.

TABLE 5003.1.1(1)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Combustible dust	NA	H-2	See Note p	NA	NA	See Note p	NA	NA	See Note p	NA
Combustible fibers[p]	Loose	H-3	(100)	NA	NA	(100)	NA	NA	(20)	NA
	Baled		(1,000)			(1,000)			(200)	
Combustible liquid	II	H-2 or H-3	NA	120[d, e]	NA	NA	120[d]	NA	NA	30[d]
	IIIA	H-2 or H-3		330[d, e]			330[d]			80[d]
	IIIB	NA		13,200[e, f]			13,200[f]			3,300[f]
Cryogenic Flammable	NA	H-2	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Cryogenic Inert	NA	NA	NA	NA	NL	NA	NA	NL	NA	NA
Cryogenic Oxidizing	NA	H-3	NA	45[d]	NA	NA	45[d]	NA	NA	10[d]
Explosives	Division 1.1	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	Division 1.2	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.3	H-1 or H-2	5[e, g]	(5)[e, g]		1[g]	(1)[g]		1[g]	(1)[g]
	Division 1.4	H-3	50[e, g]	(50)[e, g]		50[g]	(50)[g]		NA	NA
	Division 1.4G	H-3	125[e, k]	NA		NA	NA		NA	NA
	Division 1.5	H-1	1[e, g]	(1)[e, g]		0.25[g]	(0.25)[g]		0.25[g]	(0.25)[g]
	Division 1.6	H-1	1[e, g]	NA		NA	NA		NA	NA
Flammable gas	Gaseous	H-2	NA	NA		NA	NA		NA	NA
	1A and 1B (High BV)[q]				1,000[d, e]			1,000[d, e]		
	1B (Low BV)[q]				162,500[d, e]			162,500[d, e]		
	Liquefied				NA			NA		
	1A and 1B (High BV)[q]			(150)[d, e]			(150)[d, e]			
	1B (Low BV)[q]			(10,000)[d, e]			(10,000)[d, e]			

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TABLE 5003.1.1(1)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD[a, c, i, l, m, o]—continued

MATERIAL	CLASS	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
			Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)	Gas (cubic feet at NTP)	Solid pounds (cubic feet)	Liquid gallons (pounds)
Flammable liquid[n]	IA	H-2 or H-3	NA	30[d, e]	NA	NA	30[d]	NA	NA	10d
	IB and IC			120[d, e]			120[d]			30d
Flammable liquid, combination (IA, IB, IC)[n]	NA	H-2 or H-3	NA	120[d, e, h]	NA	NA	120[d, h]	NA	NA	30[d, h]
Flammable solid	NA	H-3	125[d, e]	NA	NA	125[d]	NA	NA	25[d]	NA
Inert gas	Gaseous	NA	NA	NA	NL	NA	NA	NL	NA	NA
	Liquefied	NA	NA	NA	NL	NA	NA	NL	NA	NA
Organic peroxide	UD	H-1	1[e, g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	I	H-2	5[d, e]	(5)[d, e]		1[d]	(1)[d]		1[d]	(1)[d]
	II	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	III	H-3	125[d, e]	(125)[d, e]		125[d]	(125)[d]		25[d]	(25)[d]
	IV	NA	NL	NL		NL	NL		NL	NL
	V	NA	NL	NL		NL	NL		NL	NL
Oxidizer	4	H-1	1[g]	(1)[e, g]	NA	0.25[g]	(0.25)[g]	NA	0.25[g]	(0.25)[g]
	3[j]	H-2 or H-3	10[d, e]	(10)[d, e]		2[d]	(2)[d]		2[d]	(2)[d]
	2	H-3	250[d, e]	(250)[d, e]		250[d]	(250)[d]		50[d]	(50)[d]
	1	NA	4,000[e, f]	(4,000)[e, f]		4,000[f]	(4,000)[f]		1,000[f]	(1,000)[f]
Oxidizing gas	Gaseous	H-3	NA	NA	1,500[d, e]	NA	NA	1,500[d, e]	NA	NA
	Liquefied			(150)[d, e]	NA		(150)[d, e]	NA		
Pyrophoric	NA	H-2	4[e, g]	(4)[e, g]	50[e, g]	1[g]	(1)[g]	10[e, g]	0	0
Unstable (reactive)	4	H-1	1[e, g]	(1)[e, g]	10[e, g]	0.25[g]	(0.25)[g]	2[e, g]	0.25[g]	(0.25)[g]
	3	H-1 or H-2	5[d, e]	(5)[d, e]	50[d, e]	1[d]	(1)[d]	10[d, e]	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]	750[d, e]	50[d]	(50)[d]	750[d, e]	10[d]	(10)[d]
	1	NA	NL	NL	NL	NL	NL	NL	NL	NL
Water reactive	3	H-2	5[d, e]	(5)[d, e]	NA	5[d]	(5)[d]	NA	1[d]	(1)[d]
	2	H-3	50[d, e]	(50)[d, e]		50[d]	(50)[d]		10[d]	(10)[d]
	1	NA	NL	NL		NL	NL		NL	NL

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

NA = Not Applicable, NL = Not Limited, UD = Unclassified Detonable.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the maximum allowance quantity for storage, including applicable increases.

c. For hazardous materials in Group B higher education laboratory occupancies, see Section 428 of the *California Building Code* and Chapter 38.

d. ***[SFM]*** *In other than Group L occupancies, maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively. For Group L occupancies, refer to California Building Code Table 453.7.2.1 for approved cabinets.*

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, day boxes, gas cabinets, gas rooms, exhausted enclosures or in listed safety cans in accordance with Section 5003.9.10. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. Quantities shall not be limited in a building equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

g. Allowed only in buildings equipped throughout with an approved automatic sprinkler system.

h. Containing not more than the maximum allowable quantity per control area of Class IA, Class IB or Class IC flammable liquids.

i. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

j. A maximum quantity of 220 pounds of solid or 22 gallons of liquid Class 3 oxidizers is allowed where such materials are necessary for maintenance purposes, operation or sanitation of equipment where the storage containers and the manner of storage are approved.

k. Net weight of pyrotechnic composition of the fireworks. Where the net weight of the pyrotechnic composition of the fireworks is not known, 25 percent of the gross weight of the fireworks including packaging shall be used.

l. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

m. For oxidizers, unstable (reactive) materials and water-reactive materials stored or displayed in Group M occupancies or stored in Group S occupancies, see Section 5003.11.

n. For flammable and combustible liquid storage in Group M occupancy wholesale and retail sales uses, see Section 5704.3.6.

o. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

p. Where manufactured, generated or used in such a manner that the concentration and conditions create a fire or explosion hazard based on information prepared in accordance with Section 104.2.2.

q. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s or less.

TABLE 5003.1.1(2)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[a, c, h, i, j]

MATERIAL	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
	Solid pounds[d, e, f]	Liquid gallons (pounds)[d, e, f]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]	Gas cubic feet at NTP (pounds)[d]	Solid pounds[d]	Liquid gallons (pounds)[d]
Corrosives	5,000	500	Gaseous 810[e] Liquefied (150)	5,000	500	Gaseous 810[e] Liquefied (150)	1,000	100
Highly toxics	10	(10)	Gaseous 20[g] Liquefied (4)[g]	10	(10)	Gaseous 20[g] Liquefied (4)[g]	3	(3)
Toxics	500	(500)	Gaseous 810[e] Liquefied (150)[e]	500	(500)	Gaseous 810[e] Liquefied (150)[e]	125	(125)

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L.

a. For use of control areas, see Section 5003.8.3.

b. The aggregate quantity in use and storage shall not exceed the quantity listed for storage.

c. In retail and wholesale sales occupancies, the quantities of medicines, foodstuff or consumer products and cosmetics, containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solutions not being flammable, shall not be limited, provided that such materials are packaged in individual containers not exceeding 1.3 gallons.

d. ***[SFM]*** *In other than Group L occupancies, maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. Where Note e also applies, the increase for both notes shall be applied accumulatively. For Group L occupancies, refer to California Building Code Table 453.7.2.1 for approved cabinets.*

e. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets, gas cabinets or exhausted enclosures. Where Note d applies, the increase for both notes shall be applied accumulatively.

f. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with Section 5003.11, see Table 5003.11.1.

g. Allowed only where stored in approved exhausted gas cabinets or exhausted enclosures.

h. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

i. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

j. Quantities in this table shall be modified in accordance with Table 5003.1.1(5).

TABLE 5003.1.1(3)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]

MATERIAL	CLASS	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
		Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Flammable gas	Gaseous	Not Applicable	Not Applicable		Not Applicable	Not Applicable		Not Applicable	Not Applicable
	1A and 1B (High BV)[e]			3,000			1,500		
	1B (Low BV)[e]			195,000			97,500		
	Liquefied								
	1A and 1B (High BV)[e]		(300)	Not Applicable		(150)	Not Applicable		
	1B (Low BV)[e]		(20,000)			(10,000)			
Flammable solid	Not Applicable	500	Not Applicable	Not Applicable	250	Not Applicable	Not Applicable	50	Not Applicable
Inert Gas	Gaseous	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
	Liquefied	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Cryogenic inert	Not Applicable	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable	Not Limited	Not Applicable	Not Applicable
Organic peroxide	Unclassified Detonable	1	(1)	Not Applicable	0.25	(0.25)	Not Applicable	0.25	(0.25)
Organic peroxide	I	20	(20)	Not Applicable	10	(10)	Not Applicable	2	(2)
	II	200	(200)		100	(100)		20	(20)
	III	500	(500)		250	(250)		50	(50)
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited

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TABLE 5003.1.1(3)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, d]—continued

MATERIAL	CLASS	STORAGE[b]			USE-CLOSED SYSTEMS[b]			USE-OPEN SYSTEMS[b]	
		Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]	Gas cubic feet at NTP	Solid pounds (cubic feet)	Liquid gallons (pounds)[d]
Oxidizer	4 3 2 1	2 40 1,000 Not Limited	(2) (40) (1,000) Not Limited	Not Applicable	1 20 500 Not Limited	(1) (20) (500) Not Limited	Not Applicable	0.25 4 100 Not Limited	(0.25) (4) (100) Not Limited
Oxidizing gas	Gaseous Liquefied	Not Applicable	Not Applicable (600)	6,000 Not Applicable	Not Applicable	Not Applicable (300)	1,500 Not Applicable	Not Applicable	Not Applicable
Pyrophoric materials	Not Applicable	8	(8)	100	4	(4)	10	0	0
Unstable (reactive)	4 3 2 1	2 20 200 Not Limited	(2) (20) (200) Not Limited	20 200 1,000 Not Limited	1 10 100 Not Limited	(1) (10) (100) Not Limited	2 10 250 Not Limited	0.25 1 10 Not Limited	(0.25) (1) (10) Not Limited
Water reactive	3 2 1	20 200 Not Limited	(20) (200) Not Limited	Not Applicable	10 100 Not Limited	(10) (100) Not Limited	Not Applicable	1 10 Not Limited	(1) (10) Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

e. "High BV" Category 1B flammable gas has a burning velocity greater than 3.9 in/s (10 cm/s). "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s or less.

TABLE 5003.1.1(4)—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c, f]

MATERIAL	STORAGE			USE-CLOSED SYSTEMS			USE-OPEN SYSTEMS	
	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)	Gas cubic feet at NTP (pounds)	Solid pounds	Liquid gallons (pounds)
Corrosives	20,000	2,000	Gaseous 1,620 Liquefied (300)	10,000	1,000	Gaseous 810 Liquefied (150)	1,000	100
Highly toxics	20	(20)	Gaseous 40[d] Liquefied (8)[d]	10	(10)	Gaseous 20[d] Liquefied (4)[d]	3	(3)
Toxics	1,000	(l,000)[e]	Gaseous 1,620 Liquefied (300)	500	50[e]	Gaseous 810 Liquefied (150)	125	(125)[e]

For SI: 1 cubic foot = 0.02832 m^3, 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 pound per square inch absolute = 6.895 kPa, °C = (°F – 32)/1.8.

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with Section 5003.1.2.

b. The aggregate quantities in storage and use shall not exceed the maximum allowable quantity for storage, including applicable increases.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area where such storage is in accordance with Section 5003.11.

d. Allowed only where used in approved exhausted gas cabinets, exhausted enclosures or under fume hoods.

e. The maximum allowable quantity per control area for toxic liquids with vapor pressures in excess of 1 psia at 77°F shall be the maximum allowable quantity per control area listed for highly toxic liquids.

f. Quantities in parentheses indicate quantity units in parentheses at the head of each column.

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TABLE 5003.1.1(5)—HAZARDOUS MATERIALS EXEMPTIONS[a]		
MATERIAL CLASSIFICATION	**OCCUPANCY OR APPLICATION**	**EXEMPTION**
Combustible fiber	Baled cotton	Densely packed baled cotton shall not be classified as combustible fiber, provided that the bales comply with the packing requirements of ISO 8115.
Corrosive	Building materials	The quantity of commonly used building materials that are classified as corrosive materials is not limited.
	Personal and household products	The quantity of personal and household products that are classified as corrosive materials is not limited in retail displays, provided that the products are in original packaging.
	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Explosives	Groups B, F, M and S	Storage of special industrial explosive devices is not limited.
	Groups M and R-3	Storage of black powder, smokeless propellant, and small arms primers is not limited.
Flammable and combustible liquids and gases	Aerosols	Buildings and structures occupied for the storage of aerosol products, aerosol cooking spray products, or plastic aerosol 3 products shall be classified as Group S-1.
	Alcoholic beverages	The quantity of alcoholic beverages in liquor stores and distributors without bulk storage is not limited.
		The quantity of alcoholic beverages in distilling or brewing of beverages is not limited.
		The storage quantity of beer, distilled spirits and wines in barrels and casks is not limited.
		The quantity of alcoholic beverages in retail and wholesale sales occupancies is not limited. To qualify for this allowance, beverages shall be packaged in individual containers not exceeding 1.3 gallons.
	Cleaning establish-ments with combustible liquid solvents	The quantity of combustible liquid solvents used in closed systems and having a flash point at or above 140°F is not limited. To qualify for this allowance, equipment shall be listed by an approved testing agency and the occupancy shall be separated from all other areas of the building by 1-hour fire barriers or 1-hour horizontal assemblies, or both, constructed in accordance with the *California Building Code*.
		The quantity of combustible liquid solvents having a flash point at or above 200°F is not limited.
	Closed piping systems	The quantity of flammable and combustible liquids and gases utilized for the operation of machinery or equipment is not limited.
	Flammable finishing operations using flammable and combustible liquids	Buildings and structures occupied for the application of flammable finishes shall comply with Chapter 24.
	Fuel	The quantity of liquid or gaseous fuel in fuel tanks on vehicles or motorized equipment is not limited.
		The quantity of gaseous fuels in piping systems and fixed appliances regulated by the *International Fuel Gas Code* is not limited.
		The quantity of liquid fuels in piping systems and fixed appliances regulated by the *California Mechanical Code* is not limited.
	Fuel oil	The quantity of fuel oil storage complying with Section 605.4.2 is not limited.
	Hand sanitizer	The quantity of alcohol-based hand rubs (ABHR) classified as Class I or II liquids in dispensers installed in accordance with Sections 5705.5 and 5705.5.1 is not limited. The location of the ABHR shall be provided in the construction documents.
	Retail and wholesale sales occupancies with flammable and combustible liquids	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.

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TABLE 5003.1.1(5)—HAZARDOUS MATERIALS EXEMPTIONS[a]—continued		
MATERIAL CLASSIFICATION	**OCCUPANCY OR APPLICATION**	**EXEMPTION**
Highly toxic and toxic materials	Retail and wholesale sales occupancies	The quantity of medicines, foodstuffs or consumer products, and cosmetics containing not more than 50 percent by volume of water-miscible liquids, with the remainder of the solutions not being flammable, is not limited. To qualify for this allowance, such materials shall be packaged in individual containers not exceeding 1.3 gallons.
Any	Agricultural materials	The quantity of agricultural materials stored or utilized for agricultural purposes on the premises is not limited.
	Energy storage	The quantity of hazardous materials in stationary storage battery systems is not limited.
		The quantity of hazardous materials in stationary fuel cell power systems is not limited.
		The quantity of hazardous materials in capacitor energy storage systems is not limited.
	Refrigeration systems	The quantity of refrigerants in refrigeration systems is not limited.

For SI: 1 gallon = 3.785 L, °C = (°F – 32)/1.8.

a. Exempted materials and conditions listed in this table are required to comply with provisions of this code that are not based on exceeding maximum allowable quantities in Section 5003.

5003.1.2 Conversion. Where quantities are indicated in pounds and where the weight per gallon of the liquid is not provided to the fire code official, a conversion factor of 10 pounds per gallon (1.2 kg/L) shall be used.

5003.1.3 Quantities not exceeding the maximum allowable quantity per control area. The storage, use and handling of hazardous materials in quantities not exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

5003.1.4 Quantities exceeding the maximum allowable quantity per control area. The storage and use of hazardous materials in quantities exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with this chapter.

5003.2 Systems, equipment and processes. Systems, equipment and processes utilized for storage, dispensing, use or handling of hazardous materials shall be in accordance with Sections 5003.2.1 through 5003.2.9.

5003.2.1 Design and construction of containers, cylinders and tanks. Containers, cylinders and tanks shall be designed and constructed in accordance with approved standards. Containers, cylinders, tanks and other means used for containment of hazardous materials shall be of an approved type. Pressure vessels not meeting DOTn requirements for transportation shall comply with the ASME Boiler and Pressure Vessel Code.

5003.2.2 Piping, tubing, valves and fittings. Piping, tubing, valves, and fittings conveying hazardous materials shall be designed and installed in accordance with ASME B31.1 or other approved standards, and shall be in accordance with Sections 5003.2.2.1 and 5003.2.2.2.

5003.2.2.1 Design and construction. Piping, tubing, valves, fittings and related components used for hazardous materials shall be in accordance with the following:

1. Piping, tubing, valves, fittings and related components shall be designed and fabricated from materials that are compatible with the material to be contained and shall be of adequate strength and durability to withstand the pressure, structural and seismic stress and exposure to which they are subject.
2. Piping and tubing shall be identified in accordance with ASME A13.1 to indicate the material conveyed.
3. Manual valves or automatic remotely activated fail-safe emergency shutoff valves shall be installed on supply piping and tubing and provided with ready access at the following locations:
   3.1. The point of use.
   3.2. The tank, cylinder or bulk source.
4. Manual emergency shutoff valves and controls for remotely activated emergency shutoff valves shall be clearly visible, provided with ready access and identified in an approved manner.
5. Backflow prevention or check valves shall be provided where the backflow of hazardous materials could create a hazardous condition or cause the unauthorized discharge of hazardous materials.

Exceptions:

1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

5003.2.2.2 Additional regulations for supply piping for health-hazard materials. Supply piping and tubing for gases and liquids having a health-hazard ranking of 3 or 4 in accordance with NFPA 704 shall be in accordance with ASME B31.3 and the following:

1. Piping and tubing utilized for the transmission of highly toxic, toxic or highly volatile corrosive liquids and gases shall have welded, threaded or flanged connections throughout except for connections located within a ventilated enclo-

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sure if the material is a gas, or an approved method of drainage or containment is provided for connections if the material is a liquid.

2. Piping and tubing shall not be located within corridors, within any portion of a means of egress required to be enclosed in fire-resistance-rated construction or in concealed spaces in areas not classified as Group H occupancies.

Exception: Piping and tubing within the space defined by the walls of corridors and the floor or roof above or in concealed spaces above other occupancies where installed in accordance with Section 415.11.7.4 of the *California Building Code* for Group H-5 occupancies.

5003.2.3 Equipment, machinery and alarms. Equipment, machinery and required detection and alarm systems associated with the use, storage or handling of hazardous materials shall be listed or approved.

5003.2.4 Installation of tanks. Installation of tanks shall be in accordance with Sections 5003.2.4.1 through 5003.2.4.2.1.

5003.2.4.1 Underground tanks. Underground tanks used for the storage of liquid hazardous materials shall be provided with secondary containment. In lieu of providing secondary containment for an underground tank, an above-ground tank in an underground vault complying with Section 5704.2.8 shall be permitted.

5003.2.4.2 Above-ground tanks. Above-ground stationary tanks used for the storage of hazardous materials shall be located and protected in accordance with the requirements for outdoor storage of the particular material involved.

Exception: Above-ground tanks that are installed in vaults complying with Section 5303.16 or 5704.2.8 shall not be required to comply with location and protection requirements for outdoor storage.

5003.2.4.2.1 Marking. Above-ground stationary tanks shall be marked as required by Section 5003.5.

5003.2.5 Empty containers and tanks. Empty containers and tanks previously used for the storage of hazardous materials shall be free from residual material and vapor as defined by DOTn, the Resource Conservation and Recovery Act (RCRA) or other regulating authority or maintained as specified for the storage of hazardous material.

5003.2.6 Maintenance. In addition to the requirements of Section 5003.2.3, equipment, machinery and required detection and alarm systems associated with hazardous materials shall be maintained in an operable condition. Defective containers, cylinders and tanks shall be removed from service, repaired or disposed of in an approved manner. Defective equipment or machinery shall be removed from service and repaired or replaced. Required detection and alarm systems shall be replaced or repaired where defective.

5003.2.6.1 Tanks out of service for 90 days. Stationary tanks not used for a period of 90 days shall be properly safeguarded or removed in an approved manner. Such tanks shall have the fill line, gauge opening and pump connection secured against tampering. Vent lines shall be properly maintained.

5003.2.6.1.1 Return to service. Tanks that are to be placed back in service shall be tested in an approved manner.

5003.2.6.2 Defective containers and tanks. Defective containers and tanks shall be removed from service, repaired in accordance with approved standards or disposed of in an approved manner.

5003.2.7 Liquid-level limit control. Atmospheric tanks having a capacity greater than 500 gallons (1893 L) and that contain hazardous material liquids shall be equipped with a liquid-level limit control or other approved means to prevent overfilling of the tank.

5003.2.8 Seismic protection. Machinery and equipment utilizing hazardous materials shall be braced and anchored in accordance with the seismic design requirements of the *California Building Code* for the seismic design category in which the machinery or equipment is classified.

5003.2.9 Testing. The equipment, devices and systems listed in Section 5003.2.9.1 shall be tested at the time of installation and at one of the intervals listed in Section 5003.2.9.2. Records of the tests conducted or maintenance performed shall be maintained in accordance with the provisions of Section 110.3.

Exceptions:

1. Periodic testing shall not be required where approved written documentation is provided stating that testing will damage the equipment, device or system and the equipment, device or system is maintained as specified by the manufacturer.
2. Periodic testing shall not be required for equipment, devices and systems that fail in a fail-safe manner.
3. Periodic testing shall not be required for equipment, devices and systems that self-diagnose and report trouble. Records of the self-diagnosis and trouble reporting shall be made available to the fire code official.
4. Periodic testing shall not be required if system activation occurs during the required test cycle for the components activated during the test cycle.
5. Approved maintenance in accordance with Section 5003.2.6 that is performed not less than annually or in accordance with an approved schedule shall be allowed to meet the testing requirements set forth in Sections 5003.2.9.1 and 5003.2.9.2.

5003.2.9.1 Equipment, devices and systems requiring testing. The following equipment, systems and devices shall be tested in accordance with Sections 5003.2.9 and 5003.2.9.2.

1. Gas detection systems, alarms and automatic emergency shutoff valves required by Section 6004.2.2.10 for highly toxic and toxic gases.

2. Limit control systems for liquid level, temperature and pressure required by Sections 5003.2.7, 5004.8 and 5005.1.4.
3. Emergency alarm systems and supervision required by Sections 5004.9 and 5005.4.4.
4. Monitoring and supervisory systems required by Sections 5004.10 and 5005.1.6.
5. Manually activated shutdown controls required by Section 6403.1.1.1 for compressed gas systems conveying pyrophoric gases.

5003.2.9.2 Testing frequency. The equipment, systems and devices listed in Section 5003.2.9.1 shall be tested at one of the following frequencies:

1. Not less than annually.
2. In accordance with the approved manufacturer's requirements.
3. In accordance with approved recognized industry standards.
4. In accordance with an approved schedule.

5003.3 Release of hazardous materials. Hazardous materials in any quantity shall not be released into a sewer, storm drain, ditch, drainage canal, creek, stream, river, lake or tidal waterway or on the ground, sidewalk, street, highway or into the atmosphere.

Exceptions:

1. The release or emission of hazardous materials is allowed where in compliance with federal, state or local governmental agencies, regulations or permits.
2. The release of pesticides is allowed where used in accordance with registered label directions.
3. The release of fertilizer and soil amendments is allowed where used in accordance with manufacturer's specifications.

5003.3.1 Unauthorized discharges. In the event hazardous materials are released in quantities reportable under state, federal or local regulations, the fire code official shall be notified and the following procedures required in accordance with Sections 5003.3.1.1 through 5003.3.1.4.

5003.3.1.1 Records. Records of the unauthorized discharge of hazardous materials by the permittee shall be maintained.

5003.3.1.2 Preparation. Provisions shall be made for controlling and mitigating unauthorized discharges.

5003.3.1.3 Control. Where an unauthorized discharge caused by primary container failure is discovered, the involved primary container shall be repaired or removed from service.

5003.3.1.4 Responsibility for cleanup. The person, firm or corporation responsible for an unauthorized discharge shall institute and complete all actions necessary to remedy the effects of such unauthorized discharge, whether sudden or gradual, without cost to the jurisdiction. Where deemed necessary by the fire code official, cleanup can be initiated by the fire department or by an authorized individual or firm. Costs associated with such cleanup shall be borne by the owner, operator or other person responsible for the unauthorized discharge.

5003.4 Safety Data Sheets. Safety Data Sheets (SDS) shall be readily available on the premises for hazardous materials regulated by this chapter. Where a hazardous substance is developed in a laboratory, available information shall be documented.

Exception: Designated hazardous waste.

5003.5 Hazard identification signs. Unless otherwise exempted by the fire code official, visible hazard identification signs as specified in NFPA 704 for the specific material contained shall be placed on stationary containers and above-ground tanks and at entrances to locations where hazardous materials are stored, dispensed, used or handled in quantities requiring a permit and at specific entrances and locations designated by the fire code official.

5003.5.1 Markings. Individual containers, cartons or packages shall be conspicuously marked or labeled in an approved manner. Rooms or cabinets containing compressed gases shall be conspicuously labeled: "COMPRESSED GAS."

5003.6 Signs. Signs and markings required by Sections 5003.5 and 5003.5.1 shall not be obscured or removed, shall be in English as a primary language or in symbols allowed by this code, shall be durable, and the size, color and lettering shall be approved.

5003.7 Sources of ignition. Sources of ignition shall comply with Sections 5003.7.1 through 5003.7.3.

5003.7.1 Smoking. Smoking shall be prohibited and "No Smoking" signs provided as follows:

1. In rooms or areas where hazardous materials are stored or dispensed or used in open systems in amounts requiring a permit in accordance with Section 5001.5.
2. Within 25 feet (7620 mm) of outdoor storage, dispensing or open use areas.
3. Facilities or areas within facilities that have been designated as totally "no smoking" shall have "No Smoking" signs placed at all entrances to the facility or area. Designated areas within such facilities where smoking is permitted either permanently or temporarily, shall be identified with signs designating that smoking is permitted in these areas only.
4. In rooms or areas where flammable or combustible hazardous materials are stored, dispensed or used.

Signs required by this section shall be in English as a primary language or in symbols allowed by this code and shall comply with Section 310.

5003.7.2 Open flames. Open flames and high-temperature devices shall not be used in a manner that creates a hazardous condition and shall be listed for use with the hazardous materials stored or used.

5003.7.3 Industrial trucks. Powered industrial trucks used in areas designated as hazardous (classified) locations shall be in accordance with Section 309.2.

5003.7.4 Respiratory therapy. In Group I-2 and ambulatory care facilities, within areas with respiratory therapy services, sources of ignition shall be regulated in accordance with NFPA 99.

5003.8 Construction requirements. Buildings, control areas, enclosures and cabinets for hazardous materials shall be in accordance with Sections 5003.8.1 through 5003.8.7.4.

5003.8.1 Buildings. Buildings, or portions thereof, in which hazardous materials are stored, handled or used shall be constructed in accordance with the *California Building Code*.

5003.8.2 Required detached buildings. Group H occupancies containing quantities of hazardous materials in excess of those set forth in Table 5003.8.2 shall be in detached buildings.

TABLE 5003.8.2—DETACHED BUILDING REQUIRED

A DETACHED BUILDING IS REQUIRED WHERE THE QUANTITY OF MATERIAL EXCEEDS THAT LISTED HEREIN

Material	Class	Solids and liquids (tons)[a, b]	Gases (cubic feet)[a, b]
Explosives	Division 1.1 Division 1.2 Division 1.3 Division 1.4[e] Division 1.4[c, e] Division 1.5 Division 1.6	Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity Maximum Allowable Quantity 1 Maximum Allowable Quantity Maximum Allowable Quantity	Not Applicable
Oxidizers	Class 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Unstable (reactives) detonable	Class 3 or 4	Maximum Allowable Quantity	Maximum Allowable Quantity
Oxidizer, liquids and solids	Class 3 Class 2	1,200 2,000	Not Applicable
Organic peroxides	Detonable Class I Class II Class III	Maximum Allowable Quantity Maximum Allowable Quantity 25 50	Not Applicable
Unstable (reactives) nondetonable	Class 3 Class 2	1 25	2,000 10,000
Water reactives	Class 3 Class 2	1 25	Not Applicable
Pyrophoric gases[d]	Not Applicable	Not Applicable	2,000

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.02832 m^3, 1 ton = 2000 lb = 907.2 kg.

a. For materials that are detonable, the distance to other buildings or lot lines shall be in accordance with Section 415.6 of the *California Building Code* or Chapter 56 based on the trinitrotoluene (TNT) equivalence of the material, whichever is greater.

b. "Maximum Allowable Quantity" means the maximum allowable quantity per control area set forth in Table 5003.1.1(1).

c. Limited to Division 1.4 materials and articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpackaged articles used in process operations that do not propagate a detonation or deflagration between articles, providing the net explosive weight of individual articles does not exceed 1 pound.

d. Detached buildings are not required for gases in gas rooms that support H-5 fabrication facilities where the gas room is separated from other areas by a fire barrier with a fire-resistance rating of not less than 2 hours and the gas is located in a gas cabinet that is internally sprinklered, equipped with continuous leak detection, automatic shutdown, and is not manifolded upstream of pressure controls. The gas supply is limited to cylinders that do not exceed 125 pounds water capacity in accordance with DOTn 49 CFR 173.192 for Hazard Zone A toxic gases.

e. Does not apply to consumer fireworks, Division 1.4G.

5003.8.3 Control areas. Control areas shall comply with Sections 5003.8.3.1 through 5003.8.3.5.3.

5003.8.3.1 Construction requirements. Control areas shall be separated from each other by fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both.

5003.8.3.2 Percentage of maximum allowable quantities. The percentage of maximum allowable quantities of hazardous materials per control area allowed at each story within a building shall be in accordance with Table 5003.8.3.2.

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TABLE 5003.8.3.2—DESIGN AND NUMBER OF CONTROL AREAS				
STORY		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA[a]	NUMBER OF CONTROL AREAS PER STORY	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN HOURS[b]
Above grade plane	Higher than 9	5	1	2
	7–9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade plane	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

a. Percentages shall be of the maximum allowable quantity per control area shown in Tables 5003.1.1(1) and 5003.1.1(2), with all increases allowed in the footnotes to those tables.
b. Separation shall include fire barriers and horizontal assemblies as necessary to provide separation from other portions of the building.

5003.8.3.3 Number. The maximum number of control areas per floor within a building shall be in accordance with Table 5003.8.3.2. For the purposes of determining the number of control areas within a building, each portion of a building separated by one or more fire walls complying with Section 706 of the *California Building Code* shall be considered a separate building.

5003.8.3.4 Fire-resistance-rating requirements. The required fire-resistance rating for fire barriers shall be in accordance with Table 5003.8.3.2. The floor assembly of the control area and the construction supporting the floor of the control area shall have a fire-resistance rating of not less than 2 hours.

Exception: The floor assembly of the control area and the construction supporting the floor of the control area is allowed to be 1-hour fire-resistance rated in buildings of Types IIA, IIIA, IV and VA construction, provided that both of the following conditions exist:

1. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.
2. The building is three stories or less above grade plane.

5003.8.3.5 Hazardous materials in Group M display and storage areas and in Group S storage areas. Hazardous materials located in Group M and Group S occupancies shall be in accordance with Sections 5003.8.3.5.1 through 5003.8.3.5.4.

5003.8.3.5.1 Nonflammable solids and nonflammable and noncombustible liquids. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed within a single control area of a Group M display and storage area or a Group S storage area is allowed to exceed the maximum allowable quantities per control area specified in Tables 5003.1.1(1) and 5003.1.1(2) without classifying the building or use as a Group H occupancy, provided that the materials are displayed and stored in accordance with Section 5003.11.

5003.8.3.5.2 Flammable and combustible liquids. In Group M occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area as indicated in Table 5704.3.4.1, provided that the materials are displayed and stored in accordance with Chapter 57.

5003.8.3.5.3 Aerosols. The maximum quantity of aerosol products in Group M occupancy retail display areas, storage areas adjacent to retail display areas and retail storage areas shall be in accordance with Chapter 51.

5003.8.3.5.4 Flammable gas. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single control area of a Group M occupancy, in an outdoor control area or stored in a single control area of a Group S occupancy is allowed to exceed the maximum allowable quantities per control area specified in Table 5003.1.1(1) without classifying the building or use as a Group H occupancy, provided that the materials are stored and displayed in accordance with Section 5003.11.2.

5003.8.4 Gas rooms. Where a gas room is used to increase the maximum allowable quantity per control area or provided to comply with the provisions of Chapter 60, the gas room shall be in accordance with Sections 5003.8.4.1 and 5003.8.4.2.

5003.8.4.1 Construction. Gas rooms shall be protected with an automatic sprinkler system. Gas rooms shall be separated from the remainder of the building in accordance with the requirements of the *California Building Code* based on the occupancy group into which it has been classified.

5003.8.4.2 Ventilation system. The ventilation system for gas rooms shall be designed to operate at a negative pressure in relation to the surrounding area. Highly toxic and toxic gases shall also comply with Section 6004.2.2.6. The ventilation system shall be installed in accordance with the *California Mechanical Code*.

5003.8.5 Exhausted enclosures. Where an exhausted enclosure is used to increase maximum allowable quantity per control area or where the location of hazardous materials in exhausted enclosures is provided to comply with the provisions of Chapter 60, the exhausted enclosure shall be in accordance with Sections 5003.8.5.1 through 5003.8.5.3.

5003.8.5.1 Construction. Exhausted enclosures shall be of noncombustible construction.

5003.8.5.2 Ventilation. Exhausted enclosures shall be provided with an exhaust ventilation system. The ventilation system for exhausted enclosures shall be designed to operate at a negative pressure in relation to the surrounding area. Ventilation systems used for highly toxic and toxic gases shall also comply with Items 1, 2 and 3 of Section 6004.1.3. The ventilation system shall be installed in accordance with the *California Mechanical Code*.

5003.8.5.3 Fire-extinguishing system. Exhausted enclosures where flammable materials are used shall be protected by an approved automatic fire-extinguishing system in accordance with Chapter 9.

5003.8.6 Gas cabinets. Where a gas cabinet is used to increase the maximum allowable quantity per control area or where the location of compressed gases in gas cabinets is provided to comply with the provisions of Chapter 60, the gas cabinet shall be in accordance with Sections 5003.8.6.1 through 5003.8.6.3.

5003.8.6.1 Construction. Gas cabinets shall be constructed with the following:

1. Not less than 0.097-inch (2.5 mm) (No. 12 gage) steel.
2. Self-closing limited access ports or noncombustible windows to give access to equipment controls.
3. Self-closing doors.
4. Interiors treated, coated or constructed of materials that are compatible with the hazardous materials stored. Such treatment, coating or construction shall include the entire interior of the cabinet.

5003.8.6.2 Ventilation. Gas cabinets shall be provided with an exhaust ventilation system. The ventilation system for gas cabinets shall be designed to operate at a negative pressure in relation to the surrounding area. Ventilation systems used for highly toxic and toxic gases shall also comply with Items 1, 2 and 3 of Section 6004.1.2. The ventilation system shall be installed in accordance with the *California Mechanical Code*.

5003.8.6.3 Maximum number of cylinders per gas cabinet. The number of cylinders contained in a single gas cabinet shall not exceed three.

5003.8.7 Hazardous materials storage cabinets. Where storage cabinets are used to increase maximum allowable quantity per control area or to comply with this chapter, such cabinets shall be in accordance with Sections 5003.8.7.1 through 5003.8.7.4.

5003.8.7.1 Construction. The interior of cabinets shall be treated, coated or constructed of materials that are nonreactive with the hazardous material stored. Such treatment, coating or construction shall include the entire interior of the cabinet. Cabinets shall either be listed in accordance with UL 1275 as suitable for the intended storage or constructed in accordance with the following:

1. Cabinets shall be of steel having a thickness of not less than 0.0478 inch (1.2 mm) (No. 18 gage). The cabinet, including the door, shall be double walled with a $1^1/_2$-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting.
2. The bottoms of cabinets utilized for the storage of liquids shall be liquid tight to a minimum height of 2 inches (51 mm).

5003.8.7.2 Doors. Doors shall be well fitted, self-closing and equipped with a self-latching device.

5003.8.7.3 Electrical. Electrical equipment and devices within cabinets used for the storage of hazardous gases or liquids shall be in accordance with *the California Electrical Code.*

5003.8.7.4 Warning markings. Cabinets shall be clearly identified in an approved manner with red letters on a contrasting background to read:

HAZARDOUS—KEEP FIRE AWAY

5003.9 General safety precautions. General precautions for the safe storage, handling or care of hazardous materials shall be in accordance with Sections 5003.9.1 through 5003.9.10.

5003.9.1 Personnel training and written procedures. Persons responsible for the operation of areas in which hazardous materials are stored, dispensed, handled or used shall be familiar with the chemical nature of the materials and the appropriate mitigating actions necessary in the event of fire, leak or spill.

5003.9.1.1 Fire department liaison. Responsible persons shall be designated and trained to be liaison personnel to the fire department. These persons shall aid the fire department in preplanning emergency responses and identifying the locations where hazardous materials are located, and shall have access to Safety Data Sheets and be knowledgeable in the site's emergency response procedures.

5003.9.2 Security. Storage, dispensing, use and handling areas shall be secured against unauthorized entry and safeguarded in a manner approved by the fire code official.

5003.9.3 Protection from vehicles. Guard posts or other approved means shall be provided to protect storage tanks and connected piping, valves and fittings; dispensing areas; and use areas subject to vehicular damage in accordance with Section 312.

5003.9.4 Electrical wiring and equipment. Electrical wiring and equipment shall be installed and maintained in accordance with *the California Electrical Code.*

5003.9.5 Static accumulation. Where processes or conditions exist where a flammable mixture could be ignited by static electricity, means shall be provided to prevent the accumulation of a static charge.

5003.9.6 Protection from light. Materials that are sensitive to light shall be stored in containers designed to protect them from such exposure.

5003.9.7 Shock padding. Materials that are shock sensitive shall be padded, suspended or otherwise protected against accidental dislodgement and dislodgement during seismic activity.

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5003.9.8 Separation of incompatible materials. Incompatible materials in storage and storage of materials that are incompatible with materials in use shall be separated where the stored materials are in containers having a capacity of more than 5 pounds (2 kg), 0.5 gallon (2 L) or any amount of compressed gases. Separation shall be accomplished by:

1. Segregating incompatible materials in storage by a distance of not less than 20 feet (6096 mm).
2. Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches (457 mm) above and to the sides of the stored material.
3. Storing liquid and solid materials in hazardous material storage cabinets.
4. Storing compressed gases in gas cabinets or exhausted enclosures in accordance with Sections 5003.8.5 and 5003.8.6.

Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

5003.9.9 Shelf storage. Shelving shall be of substantial construction, and shall be braced and anchored in accordance with the seismic design requirements of the *California Building Code* for the seismic design category in which the material is located. Shelving shall be treated, coated or constructed of materials that are compatible with the hazardous materials stored. Shelves shall be provided with a lip or guard where used for the storage of individual containers.

Shelf storage of hazardous materials shall be maintained in an orderly manner.

Exceptions:

1. Storage in hazardous material storage cabinets or laboratory furniture specifically designed for such use.
2. Storage of hazardous materials in amounts not requiring a permit in accordance with Section 5001.5.

5003.9.10 Safety cans. Safety cans shall be listed in accordance with UL 30 where used to increase the maximum allowable quantities per control area of flammable or combustible liquids in accordance with Table 5003.1.1(1). Safety cans listed in accordance with UL 1313 are allowed for flammable and combustible liquids where not used to increase the maximum allowable quantities per control area and for other hazardous material liquids in accordance with the listing.

5003.10 Handling and transportation. In addition to the requirements of Section 5003.2, the handling and transportation of hazardous materials in corridors or enclosures for stairways and ramps shall be in accordance with Sections 5003.10.1 through 5003.10.3.6.

5003.10.1 Valve protection. Hazardous material gas containers, cylinders and tanks in transit shall have their protective caps in place. Containers, cylinders and tanks of highly toxic or toxic compressed gases shall have their valve outlets capped or plugged with an approved closure device in accordance with Chapter 53.

5003.10.2 Carts and trucks required. Liquids in containers exceeding *5.28 gallons (20 L) in an elevator,* a corridor or enclosure for a stairway or ramp shall be transported on a cart or truck. Containers of hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 and transported within *an elevator,* corridors or interior exit stairways and ramps, shall be on a cart or truck. Where carts and trucks are required for transporting hazardous materials, they shall be in accordance with Section 5003.10.3. *Exceptions 1 through 4 shall not apply where elevators are utilized.*

Exceptions:

1. Two hazardous material liquid containers that are hand carried in acceptable safety carriers.
2. Not more than four drums not exceeding 55 gallons (208 L) each that are transported by suitable drum trucks.
3. Containers and cylinders of compressed gases that are transported by approved hand trucks, and containers and cylinders not exceeding 25 pounds (11 kg) that are hand carried.
4. Solid hazardous materials not exceeding 100 pounds (45 kg) that are transported by approved hand trucks, and a single container not exceeding 50 pounds (23 kg) that is hand carried.

5003.10.2.1 On the 11th story and above. *On the 11th story and above of any occupancy, all vertical handling and transportation of hazardous materials in the building shall be in approved carts.*

5003.10.2.2 Transportation of hazardous materials on the 11th story and above. *The handling and transportation of hazardous materials on the 11th story and above shall be limited to 5 percent of the maximum allowable quantities of Tables 5003.1(1) and (2). Quantities are permitted to be increased by 100 percent in buildings with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Materials where footnote g applies shall not be increased.*

5003.10.3 Carts and trucks. Carts and trucks required by Section 5003.10.2 to be used to transport hazardous materials shall be in accordance with Sections 5003.10.3.1 through 5003.10.3.6.

5003.10.3.1 Design. Carts and trucks used to transport hazardous materials shall be designed to provide a stable base for the commodities to be transported and shall have a means of restraining containers to prevent accidental dislodgement. Compressed gas cylinders placed on carts and trucks shall be individually restrained.

5003.10.3.2 Speed-control devices. Carts and trucks shall be provided with a device that will enable the operator to control safely movement by providing stops or speed-reduction devices.

5003.10.3.3 Construction. Construction materials for hazardous material carts or trucks shall be compatible with the material transported. The cart or truck shall be of substantial construction.

5003.10.3.4 Spill control. Carts and trucks transporting liquids shall be capable of containing a spill from the largest single container transported.

5003.10.3.5 Attendance. Carts and trucks used to transport materials shall not obstruct or be left unattended within any part of a means of egress.

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5003.10.3.6 Incompatible materials. Incompatible materials shall not be transported on the same cart or truck.

5003.10.4 Elevators utilized to transport hazardous materials.

5003.10.4.1 *When transporting hazardous materials, elevators shall have no other passengers other than the individual(s) handling the chemical transport cart.*

5003.10.4.1.1 *When transporting cryogenic or liquefied compressed gases, there shall be no occupants in the elevator.*

5003.10.4.2 *Hazardous materials liquid containers shall have a maximum capacity of 20 liters (5.28 gal).*

5003.10.4.3 *Toxic and highly-toxic gases shall be limited to a container of a maximum water capacity of 1 pound.*

5003.10.4.4 *When transporting cryogenic or liquefied compressed gases, means shall be provided to prevent the elevator from being summoned to other floors.*

5003.10.5 *Elevators or conveyance systems utilized to transport hazardous materials in excess of the quantities listed in Section 5003.10.4 shall comply with Sections 5003.10.5.1 through 5003.10.5.6.*

5003.10.5.1 *Elevators or conveyance hoist-way enclosures shall be located in a shaft constructed in accordance with Section 713 of the California Building Code.*

5003.10.5.2 *Elevators shall have no passengers other than the individual handling the chemical transport and shall comply with the requirements of Section 5003.10.4.*

5003.10.5.2.1 *When transporting cryogenic or liquefied compressed gases, there shall be no occupants in the elevator.*

5003.10.5.3 *Spill containment shall be provided for all transported liquids.*

5003.10.5.4 *Ventilation shall be provided in the elevator shaft in accordance with Section 5004.3.1.*

5003.10.5.5 *Signage shall be provided on all floors adjacent to each elevator call station to indicate the elevator is designated for hazardous materials transportation.*

5003.10.5.6 *Use of an elevator or conveyance system described in this section shall be restricted to personnel that have been properly trained.*

5003.10.5.7 *Means shall be provided to prevent the elevator from being summoned to other floors.*

5003.10.6 Posted sequence of operation. *A documented sequence of operation shall be submitted to the authority having jurisdiction for review and approval prior to the transportation of hazardous materials in elevators or conveyance systems described in Section 5003.10.5.*

5003.10.6.1 *The approved sequence of operations shall be posted in the elevator car or conveyance system.*

5003.10.6.2 *The approved sequence of operation shall be maintained and tested upon the request of the authority having jurisdiction.*

5003.11 ***Maximum allowable quantity for*** **Group M storage and display and Group S storage.** The aggregate quantity of hazardous materials stored and displayed within a single control area of a Group M occupancy, or an outdoor control area, or stored in a single control area of a Group S occupancy, is allowed to exceed the maximum allowable quantity per control area indicated in Section 5003.1 where in accordance with Sections 5003.11.1 *and* 5003.11.2.

5003.11.1 Nonflammable solid and nonflammable or noncombustible liquid hazardous materials. The aggregate amount of nonflammable solid and nonflammable or noncombustible liquid hazardous materials stored and displayed within a single control area of a Group M occupancy, in an outdoor control area or stored in a single control area of a Group S occupancy shall not exceed the amounts set forth in Table 5003.11.1.

TABLE 5003.11.1—MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES—NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS[d, e, f]

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	Class	Solids (pounds)	Liquids (gallons)
A. Health-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids			
1. Corrosives[b, c]	Not Applicable	9,750	975
2. Highly toxics	Not Applicable	20[b, c]	2[b, c]
3. Toxics[b, c]	Not Applicable	1,000[k]	100
B. Physical-Hazard Materials—Nonflammable and Noncombustible Solids and Liquids			
1. Oxidizers[b, c]	4	Not Allowed	Not Allowed
	3	1,350[g]	135
	2	2,250[h]	225
	1	18,000[i, j]	1,800[i, j]
2. Unstable (reactives)[b, c]	4	Not Allowed	Not Allowed
	3	550	55
	2	1,150	115
	1	Not Limited	Not Limited

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TABLE 5003.11.1—MAXIMUM ALLOWABLE QUANTITY PER INDOOR AND OUTDOOR CONTROL AREA IN GROUP M AND S OCCUPANCIES—NONFLAMMABLE SOLIDS, NONFLAMMABLE AND NONCOMBUSTIBLE LIQUIDS[d, e, f]—continued

CONDITION		MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	
Material[a]	Class	Solids (pounds)	Liquids (gallons)
3. Water reactives	3[b, c]	550	55
	2[b, c]	1,150	115
	1	Not Limited	Not Limited

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3.

a. Hazard categories are as specified in Section 5001.2.2.

b. Maximum allowable quantities shall be increased 100 percent in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Where Note c applies, the increase for both notes shall be applied accumulatively.

c. Maximum allowable quantities shall be increased 100 percent where stored in approved storage cabinets in accordance with Section 5003.8. Where Note b applies, the increase for both notes shall be applied accumulatively.

d. See Table 5003.8.3.2 for design and number of control areas.

e. Maximum allowable quantities for other hazardous material categories shall be in accordance with Section 5003.1.

f. Maximum allowable quantities shall be increased 100 percent in outdoor control areas.

g. Maximum allowable quantities shall be increased to 2,250 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

h. Maximum allowable quantities shall be increased to 4,500 pounds where individual packages are in the original sealed containers from the manufacturer or packager and do not exceed 10 pounds each.

i. Quantities are unlimited where protected by an automatic sprinkler system.

j. Quantities are unlimited in an outdoor control area.

k. Maximum allowable quantity of consumer products shall be increased to 10,000 pounds where individual packages are in the original sealed containers from the manufacturer and the toxic classification is exclusively based on the LC_{50} threshold and no other hazardous materials classifications apply.

5003.11.1.1 Storage and display. Storage and display shall be in accordance with Sections 5003.11.1.1.1 through 5003.11.1.1.11.

5003.11.1.1.1 Density. Storage and display of solids shall not exceed 200 pounds per square foot (976 kg/m^2) of floor area actually occupied by solid merchandise. Storage and display of liquids shall not exceed 20 gallons per square foot (0.50 L/m^2) of floor area actually occupied by liquid merchandise.

5003.11.1.1.2 Storage and display height. Display height shall not exceed 6 feet (1829 mm) above the finished floor in display areas of Group M occupancies. Storage height shall not exceed 8 feet (2438 mm) above the finished floor in storage areas of Group M and Group S occupancies.

5003.11.1.1.3 Container location. Individual containers less than 5 gallons (19 L) or less than 25 pounds (11 kg) shall be stored or displayed on pallets, racks or shelves.

5003.11.1.1.4 Racks and shelves. Racks and shelves used for storage or display shall be in accordance with Section 5003.9.9.

5003.11.1.1.5 Container type. Containers shall be approved for the intended use and identified as to their content.

5003.11.1.1.6 Container size. Individual containers shall not exceed 100 pounds (45 kg) for solids or 10 gallons (38 L) for liquids in storage and display areas.

5003.11.1.1.7 Incompatible materials. Incompatible materials shall be separated in accordance with Section 5003.9.8.

5003.11.1.1.8 Floors. Floors shall be in accordance with Section 5004.12.

5003.11.1.1.9 Aisles. Aisles 4 feet (1219 mm) in width shall be maintained on three sides of the storage or display area.

5003.11.1.1.10 Signs. Hazard identification signs shall be provided in accordance with Section 5003.5.

5003.11.1.1.11 Storage plan. A storage plan illustrating the intended storage arrangement, including the location and dimensions of aisles, and storage racks shall be provided.

5003.11.2 Category 1B flammable gas with low burning velocity. The aggregate quantity of Category 1B flammable gas having a burning velocity of 3.9 in/s (10 cm/s) or less stored and displayed within a single control area of a Group M occupancy, in an outdoor control area or stored in a single control area of a Group S occupancy shall not exceed the amounts set forth in Table 5003.11.2.

TABLE 5003.11.2—MAXIMUM ALLOWABLE QUANTITY OF LOW BURNING VELOCITY CATEGORY 1B FLAMMABLE GAS IN GROUP M AND S OCCUPANCIES PER CONTROL AREA[a]

CATEGORY 1B (Low BV)[d]	SPRINKLERED IN ACCORDANCE WITH NOTE B	NONSPRINKLERED
Gaseous	390,000 ft^3	195,000 ft^3
Liquified	40,000 lb[c]	20,000 lb

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.028 m^3.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. The building shall be equipped throughout with an approved automatic sprinkler system with a minimum sprinkler design density of Ordinary Hazard Group 2 in the area where flammable gases are stored or displayed.

c. Where storage areas exceed 50,000 square feet in area, the maximum allowable quantities area is allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. Separation of control areas is not required. The aggregate amount shall not exceed 80,000 pounds.

d. "Low BV" Category 1B flammable gas has a burning velocity of 3.9 in/s (10 cm/s) or less.

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5003.11.2.1 Fire protection and storage arrangements. Fire protection and container storage arrangements for quantities of Category 1B flammable gases permitted by Table 5003.11.2 shall be in accordance with the all of the following:

1. Storage of Category 1B flammable gases on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Rack storage, pallet storage or piles of Category 1B flammable gas greater than 6 feet 6 inches (1981 mm) in height shall be provided with an automatic sprinkler system with a minimum design density of Extra Hazard Group 1.
3. Combustible commodities shall not be stored above Category 1B flammable gases.
4. Flammable liquids shall be separated from Category 1B flammable gases by a distance of not less than 20 feet (6096 mm). The separation is permitted to be reduced to 10 feet (3048 mm) where secondary containment or diking is provided to retain a flammable liquid spill at a distance of 10 feet (3048 mm) from the Category 1B flammable gas storage.

5003.12 Outdoor control areas. Outdoor control areas for hazardous materials shall be in accordance with the following general requirements:

1. Outdoor control areas shall be kept free from weeds, debris and common combustible materials not necessary to the storage. The area surrounding an outdoor control area shall be kept clear of such materials for not less than 15 feet (4572 mm).
2. Outdoor control areas shall be located not closer than 20 feet (6096 mm) from a public street, public alley, public way or lot line that can be built on.

   Exceptions:

   1. For solid and liquid hazardous materials, a 2-hour fire-resistance-rated wall without openings extending not less than 30 inches (762 mm) above and to the sides of the storage area shall be allowed in lieu of such distance.
   2. For compressed gas hazardous materials, unless otherwise specified, the minimum required distances shall not apply where fire barriers without openings or penetrations having a minimum fire-resistance rating of 2 hours interrupt the line of sight between the storage and the exposure. The configuration of the fire barrier shall be designed to allow natural ventilation to prevent the accumulation of hazardous gas concentrations.
3. Where a property exceeds 10,000 square feet (929 m^2), a group of two outdoor control areas is allowed where approved and where each control area is separated by a minimum distance of 50 feet (15 240 mm).
4. Where a property exceeds 35,000 square feet (3252 m^2), additional groups of outdoor control areas are allowed where approved and where each group is separated by a minimum distance of 300 feet (91 440 mm).

5003.13 Outdoor rooftop storage, use and handling. Storage, use and handling and use of hazardous materials on top of roofs or canopies shall be classified as rooftop storage or use and shall comply with Sections 5003.13.1 through 5003.13.5.

5003.13.1 Occupancy classification. Quantities of hazardous materials stored, used or handled on top of roofs or canopies shall be classified as rooftop storage or use and shall not be used to determine the occupancy classification of the building.

5003.13.2 Maximum allowable quantity per rooftop or canopy. The storage, use and handling of hazardous materials on top of a roof or canopy shall not exceed the maximum allowable quantity set forth in Tables 5003.1.1(1) and 5003.1.1(2). LP-gas storage and use shall be in accordance with Chapter 61.

Exceptions:

1. Pollution control, exhaust treatment and dust collection equipment.
2. Combustible liquids complying with Chapter 57 and NFPA 30.
3. Hydrogen storage at motor fuel-dispensing facilities in accordance with Chapter 23.
4. Hazardous materials in closed piping systems complying with this code.
5. Hazardous materials on top of a normally unoccupied exterior equipment platform necessary for operation of mechanical systems or industrial process equipment.
6. Hazardous materials necessary for rooftop swimming pool or hot tub treatment systems, limited to a maximum container size of 50 gallons (189 L) or 500 pounds (227 kg) of toxic or corrosive materials, and 200 pounds (91 kg) or 20 gallons (76 L) of oxidizers.
7. Other situations where rooftop storage or use of hazardous materials is necessary for the operation of equipment serving the building and is approved.

5003.13.3 Story adjustment. In addition to the quantity limits in Section 5003.13.2, rooftop storage and use shall be limited to the percentage of maximum allowable quantity identified in Table 5003.8.3.2 based on the number of stories above grade of the building on which the roof is located.

5003.13.4 Other requirements. In addition to the quantity limits of this section, rooftop storage and use shall comply with other applicable requirements of this code for outdoor storage. This section applies to the exceptions identified in Section 5003.13.2.

5003.13.5 Weather protection. Weather protection provided for sheltering rooftop storage or use shall comply with Section 414.6.1 of the *California Building Code*, except that there is no distance required to the building on which it is located.

SECTION 5004—STORAGE

5004.1 Scope. Storage of hazardous materials in amounts exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5004. Storage of hazardous materials in amounts not exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall be in accordance with Sections 5001 and

5003. Retail and wholesale storage and display of nonflammable solid and nonflammable and noncombustible liquid hazardous materials in Group M occupancies and Group S storage shall be in accordance with Section 5003.11.

5004.2 Spill control and secondary containment for liquid and solid hazardous materials. Rooms, buildings or areas used for the storage of liquid or solid hazardous materials shall be provided with spill control and secondary containment in accordance with Sections 5004.2.1 through 5004.2.3.

Exception: Outdoor storage of containers on approved containment pallets in accordance with Section 5004.2.3.

5004.2.1 Spill control for hazardous material liquids. Rooms, buildings or areas used for the storage of hazardous material liquids in individual vessels having a capacity of more than 55 gallons (208 L), or in which the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L), shall be provided with spill control to prevent the flow of liquids to adjoining areas. Floors in indoor locations and similar surfaces in outdoor locations shall be constructed to contain a spill from the largest single vessel by one of the following methods:

1. Liquid-tight sloped or recessed floors in indoor locations or similar areas in outdoor locations.
2. Liquid-tight floors in indoor locations or similar areas in outdoor locations provided with liquid-tight raised or recessed sills or dikes.
3. Sumps and collection systems.
4. Other approved engineered systems.

Except for surfacing, the floors, sills, dikes, sumps and collection systems shall be constructed of noncombustible material, and the liquid-tight seal shall be compatible with the material stored. Where liquid-tight sills or dikes are provided, they are not required at perimeter openings having an open-grate trench across the opening that connects to an approved collection system.

5004.2.2 Secondary containment for hazardous material liquids and solids. Where required by Table 5004.2.2, buildings, rooms or areas used for the storage of hazardous materials liquids or solids shall be provided with secondary containment in accordance with this section where the capacity of an individual vessel or the aggregate capacity of multiple vessels exceeds both of the following:

1. Liquids: Capacity of an individual vessel exceeds 55 gallons (208 L) or the aggregate capacity of multiple vessels exceeds 1,000 gallons (3785 L).
2. Solids: Capacity of an individual vessel exceeds 550 pounds (250 kg) or the aggregate capacity of multiple vessels exceeds 10,000 pounds (4540 kg).

TABLE 5004.2.2—REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE

MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	Liquids	Solids	Liquids
1. Physical-hazard materials					
Combustible liquids	Class II	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IIIA		See Chapter 57		See Chapter 57
	Class IIIB		See Chapter 57		See Chapter 57
Cryogenic fluids			See Chapter 55		See Chapter 55
Explosives		See Chapter 56		See Chapter 56	
Flammable liquids	Class IA	Not Applicable	See Chapter 57	Not Applicable	See Chapter 57
	Class IB		See Chapter 57		See Chapter 57
	Class IC		See Chapter 57		See Chapter 57
Flammable solids		Not Required	Not Applicable	Not Required	Not Applicable
Organic peroxides	Unclassified Detonable	Required	Required	Not Required	Not Required
	Class I				
	Class II				
	Class III				
	Class IV				
	Class V	Not Required	Not Required	Not Required	Not Required
Oxidizers	Class 4	Required	Required	Not Required	Not Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required

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TABLE 5004.2.2—REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL SOLIDS AND LIQUIDS STORAGE—continued					
MATERIAL		INDOOR STORAGE		OUTDOOR STORAGE	
		Solids	Liquids	Solids	Liquids
Pyrophorics		Not Required	Required	Not Required	Required
Unstable (reactives)	Class 4	Required	Required	Required	Required
	Class 3				
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
Water reactives	Class 3	Required	Required	Required	Required
	Class 2				
	Class 1	Not Required	Not Required	Not Required	Not Required
2. Health-hazard materials					
Corrosives		Not Required	Required	Not Required	Required
Highly toxics		Required	Required	Required	Required
Toxics					

5004.2.2.1 Containment and drainage methods. The building, room or area shall contain or drain the hazardous materials and fire protection water through the use of one of the following methods:

1. Liquid-tight sloped or recessed floors in indoor locations or similar areas in outdoor locations.
2. Liquid-tight floors in indoor locations or similar areas in outdoor locations provided with liquid-tight raised or recessed sills or dikes.
3. Sumps and collection systems.
4. Drainage systems leading to an approved location.
5. Other approved engineered systems.

5004.2.2.2 Incompatible materials. Incompatible materials used in open systems shall be separated from each other in the secondary containment system.

5004.2.2.3 Indoor design. Secondary containment for indoor storage areas shall be designed to contain a spill from the largest vessel plus the design flow volume of fire protection water calculated to discharge from the fire-extinguishing system over the minimum required system design area or area of the room or area in which the storage is located, whichever is smaller. The containment capacity shall be designed to contain the flow for a period of 20 minutes.

5004.2.2.4 Outdoor design. Secondary containment for outdoor storage areas shall be designed to contain a spill from the largest individual vessel. If the area is open to rainfall, secondary containment shall be designed to include the volume of a 24-hour rainfall as determined by a 25-year storm and provisions shall be made to drain accumulations of groundwater and rainwater.

5004.2.2.5 Monitoring. An approved monitoring method shall be provided to detect hazardous materials in the secondary containment system. The monitoring method is allowed to be visual inspection of the primary or secondary containment, or other approved means. Where secondary containment is subject to the intrusion of water, a monitoring method for detecting water shall be provided. Where monitoring devices are provided, they shall be connected to approved visual or audible alarms.

5004.2.2.6 Drainage system design. Drainage systems shall be in accordance with the *California Plumbing Code* and all of the following:

1. The slope of floors to drains in indoor locations, or similar areas in outdoor locations shall be not less than 1 percent.
2. Drains from indoor storage areas shall be sized to carry the volume of the fire protection water as determined by the design density discharged from the automatic fire-extinguishing system over the minimum required system design area or area of the room or area in which the storage is located, whichever is smaller.
3. Drains from outdoor storage areas shall be sized to carry the volume of the fire flow and the volume of a 24-hour rainfall as determined by a 25-year storm.
4. Materials of construction for drainage systems shall be compatible with the materials stored.
5. Incompatible materials used in open systems shall be separated from each other in the drainage system.
6. Drains shall terminate in an approved location away from buildings, valves, means of egress, fire access roadways, adjoining property and storm drains.

5004.2.3 Containment pallets. Where used as an alternative to spill control and secondary containment for outdoor storage in accordance with the exception in Section 5004.2, containment pallets shall comply with all of the following:

1. A liquid-tight sump with access for visual inspection shall be provided.
2. The sump shall be designed to contain not less than 66 gallons (250 L).

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3. Exposed surfaces shall be compatible with material stored.
4. Containment pallets shall be protected to prevent collection of rainwater within the sump.

5004.3 Ventilation. Indoor storage areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation where natural ventilation can be shown to be acceptable for the materials as stored.

Exceptions:

1. Storage areas for flammable solids complying with Chapter 59.
2. Storage areas for medical gases complying with Chapter 53.

5004.3.1 System requirements. Exhaust ventilation systems shall comply with all of the following:

1. Installation shall be in accordance with the *California Mechanical Code*.
2. Mechanical ventilation shall be at a rate of not less than 1 cubic foot per minute per square foot [0.00508 $m^3/(s \times m^2)$] of floor area over the storage area.
3. Systems shall operate continuously unless alternative designs are approved.
4. A manual shutoff control shall be provided outside of the room in a position adjacent to the access door to the room or in an approved location. The switch shall be a break-glass or other approved type and shall be labeled: "VENTILATION SYSTEM EMERGENCY SHUTOFF."

   Exception: *[For SFM] When exhaust systems containing explosive, corrosive, combustible, flammable or highly toxic dusts, mists, fumes, vapors or gases are 100 percent exhausted to the outside, an emergency ventilation system shutoff is not required.*
5. Exhaust ventilation shall be designed to consider the density of the potential fumes or vapors released. For fumes or vapors that are heavier than air, exhaust shall be taken from a point within 12 inches (305 mm) of the floor. For fumes or vapors that are lighter than air, exhaust shall be taken from a point within 12 inches (305 mm) of the highest point of the room.
6. The location of both the exhaust and inlet air openings shall be designed to provide air movement across all portions of the floor or room to prevent the accumulation of vapors.
7. Exhaust air shall not be recirculated to occupied areas if the materials stored are capable of emitting hazardous vapors and contaminants have not been removed. Air contaminated with explosive or flammable vapors, fumes or dusts; flammable, highly toxic or toxic gases; or radioactive materials shall not be recirculated.

5004.4 Separation of incompatible hazardous materials. Incompatible materials shall be separated in accordance with Section 5003.9.8.

5004.5 Automatic sprinkler systems. Indoor storage areas and storage buildings shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1. The design of the sprinkler system shall be not less than that required for Ordinary Hazard Group 2 with a minimum design area of 3,000 square feet (279 m^2). Where the materials or storage arrangement are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

5004.6 Explosion control. Indoor storage rooms, areas and buildings shall be provided with explosion control in accordance with Section 911.

5004.7 Standby or emergency power. Where mechanical ventilation, treatment systems, temperature control, alarm, detection or other electrically operated systems are required, such systems shall be provided with an emergency or standby power in accordance with Section 1203.

For storage areas for highly toxic or toxic materials, see Sections 6004.2.2.8 and 6004.3.4.2.

5004.7.1 Exempt applications. Standby or emergency power is not required for mechanical ventilation systems for any of the following:

1. Storage of Class IB and IC flammable liquids and Class II and III combustible liquids in closed containers not exceeding a capacity of $6^1/_2$ gallons (25 L).
2. Storage of Class 1 and 2 oxidizers.
3. Storage of Class II, III, IV and V organic peroxides.
4. Storage of asphyxiant, irritant and radioactive gases.

5004.7.2 Fail-safe engineered systems. Standby power for mechanical ventilation, treatment systems and temperature control systems shall not be required where an approved fail-safe engineered system is installed.

5004.8 Limit controls. Limit controls shall be provided in accordance with Sections 5004.8.1 and 5004.8.2.

5004.8.1 Temperature control. Materials that must be kept at temperatures other than normal ambient temperatures to prevent a hazardous reaction shall be provided with an approved means to maintain the temperature within a safe range. Redundant temperature control equipment that will operate on failure of the primary temperature control system shall be provided. Where approved, alternative means that prevent a hazardous reaction are allowed.

5004.8.2 Pressure control. Stationary tanks and equipment containing hazardous material liquids that can generate pressures exceeding design limits because of exposure fires or internal reaction shall have some form of construction or other approved means that will relieve excessive internal pressure. The means of pressure relief shall vent to an approved location or to an exhaust scrubber or treatment system where required by Chapter 60.

5004.9 Emergency alarm. An approved manual emergency alarm system shall be provided in buildings, rooms or areas used for storage of hazardous materials. Emergency alarm-initiating devices shall be installed outside of each interior exit or exit access door of storage buildings, rooms or areas. Activation of an emergency alarm-initiating device shall sound a local alarm to alert occupants of an emergency situation involving hazardous materials.

5004.10 Supervision and monitoring. Emergency alarm, detection and automatic fire-extinguishing systems required by Section 5004 shall be electrically supervised and monitored by an approved supervising station or, where approved, shall initiate an audible and visual signal at a constantly attended on-site location.

5004.11 Clearance from combustibles. The area surrounding an outdoor storage area or tank shall be kept clear of combustible materials and vegetation for a minimum distance of 25 feet (7620 mm).

5004.12 Noncombustible floor. Except for surfacing, floors of storage areas shall be of noncombustible construction.

5004.13 Weather protection. Where overhead noncombustible construction is provided for sheltering outdoor hazardous material storage areas, such storage shall not be considered indoor storage where the area is constructed in accordance with the requirements for weather protection as required by the *California Building Code*.

Exception: Storage of explosive materials shall be considered as indoor storage.

5004.14 Outdoor storage location. Outdoor storage areas for hazardous materials shall be located as required by Section 5003.12 except where material-specific requirements, including requirements in referenced standards, are provided in other chapters of this code.

SECTION 5005—USE, DISPENSING AND HANDLING

5005.1 General. Use, dispensing and handling of hazardous materials in amounts exceeding the maximum allowable quantity per control area set forth in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5005. Use, dispensing and handling of hazardous materials in amounts not exceeding the maximum allowable quantity per control area set forth in Section 5003.1 shall be in accordance with Sections 5001 and 5003.

5005.1.1 Separation of incompatible materials. Separation of incompatible materials shall be in accordance with Section 5003.9.8.

5005.1.2 Noncombustible floor. Except for surfacing, floors of areas where liquid or solid hazardous materials are dispensed or used in open systems shall be of noncombustible, liquid-tight construction.

5005.1.3 Spill control and secondary containment for hazardous material liquids. Where required by other provisions of Section 5005, spill control and secondary containment shall be provided for hazardous material liquids in accordance with Section 5004.2.

5005.1.4 Limit controls. Limit controls shall be provided in accordance with Sections 5005.1.4.1 through 5005.1.4.4.

5005.1.4.1 High-liquid-level control. Open tanks in which liquid hazardous materials are used shall be equipped with a liquid-level limit control or other means to prevent overfilling of the tank.

5005.1.4.2 Low-liquid-level control. Approved safeguards shall be provided to prevent a low-liquid level in a tank from creating a hazardous condition, including but not limited to, overheating of a tank or its contents.

5005.1.4.3 Temperature control. Temperature control shall be provided in accordance with Section 5004.8.1.

5005.1.4.4 Pressure control. Pressure control shall be provided in accordance with Section 5004.8.2.

5005.1.5 Standby or emergency power. Where mechanical ventilation, treatment systems, temperature control, manual alarm, detection or other electrically operated systems are required by this code, such systems shall be provided with emergency or standby power in accordance with Section 1203.

5005.1.5.1 Exempt applications. Standby power for mechanical ventilation, treatment systems and temperature control systems shall not be required where an approved fail-safe engineered system is installed.

5005.1.6 Supervision and monitoring. Manual alarm, detection and automatic fire-extinguishing systems required by other provisions of Section 5005 shall be electrically supervised and monitored by an approved supervisory service or, where approved, shall initiate an audible and visual signal at a constantly attended on-site location.

5005.1.7 Lighting. Adequate lighting by natural or artificial means shall be provided.

5005.1.8 Fire protection systems. Indoor rooms or areas in which hazardous materials are dispensed or used shall be protected by an automatic sprinkler system or automatic fire-extinguishing system in accordance with Chapter 9. Sprinkler system design shall be not less than that required for Ordinary Hazard, Group 2, with a minimum design area of 3,000 square feet (279 m^2). Where the materials or storage arrangement are required by other regulations to be provided with a higher level of sprinkler system protection, the higher level of sprinkler system protection shall be provided.

5005.1.9 Ventilation. Indoor dispensing and use areas shall be provided with exhaust ventilation in accordance with Section 5004.3.

Exception: Ventilation is not required for dispensing and use of flammable solids other than finely divided particles.

5005.1.10 Liquid transfer. Liquids having a hazard ranking of 3 or 4 in accordance with NFPA 704 shall be transferred by one of the following methods:

1. From safety cans complying with UL 30.

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2. Through an approved closed piping system.
3. From containers or tanks by an approved pump taking suction through an opening in the top of the container or tank.
4. From containers or tanks by gravity through an approved self-closing or automatic-closing valve where the container or tank and dispensing operations are provided with spill control and secondary containment in accordance with Section 5004.2. Highly toxic liquids shall not be dispensed by gravity from tanks.
5. Approved engineered liquid transfer systems.

Exceptions:

1. Liquids having a hazard ranking of 4 where dispensed from approved containers not exceeding 1.3 gallons (5 L).
2. Liquids having a hazard ranking of 3 where dispensed from approved containers not exceeding 5.3 gallons (20 L).

5005.1.11 Design. Systems shall be suitable for the use intended and shall be designed by persons competent in such design. Controls shall be designed to prevent materials from entering or leaving the process or reaction system at other than the intended time, rate or path. Where failure of an automatic control could result in a dangerous condition or reaction, the automatic control shall be fail-safe.

5005.1.12 Emergency isolation. Where gases or liquids having a hazard ranking of Health Class 3 or 4, Flammability Class 4 or Instability Class 3 or 4 in accordance with NFPA 704 are carried in pressurized piping above 15 pounds per square inch gauge (psig) (103 kPa), an approved means of leak detection and emergency shutoff or excess flow control shall be provided. Where the piping originates from within a hazardous material storage room or area, the excess flow control shall be located within the storage room or area. Where the piping originates from a bulk source, the excess flow control shall be located as close to the bulk source as practical.

Exceptions:

1. Piping for inlet connections designed to prevent backflow.
2. Piping for pressure relief devices.

5005.2 Indoor dispensing and use. Indoor dispensing and use of hazardous materials shall be in buildings complying with the *California Building Code* and in accordance with Section 5005.1 and Sections 5005.2.1 through 5005.2.2.4.

5005.2.1 Open systems. Dispensing and use of hazardous materials in open containers or systems shall be in accordance with Sections 5005.2.1.1 through 5005.2.1.4.

5005.2.1.1 Ventilation. Where gases, liquids or solids having a hazard ranking of 3 or 4 in accordance with NFPA 704 are dispensed or used, mechanical exhaust ventilation shall be provided to capture gases, fumes, mists or vapors at the point of generation.

Exception: Gases, liquids or solids that can be demonstrated not to create harmful gases, fumes, mists or vapors.

5005.2.1.2 Explosion control. Explosion control shall be provided in accordance with Section 5004.6 where an explosive environment can occur because of the characteristics or nature of the hazardous materials dispensed or used, or as a result of the dispensing or use process.

5005.2.1.3 Spill control for hazardous material liquids. Buildings, rooms or areas where hazardous material liquids are dispensed into vessels exceeding a 1.3-gallon (5 L) capacity or used in open systems exceeding a 5.3-gallon (20 L) capacity shall be provided with spill control in accordance with Section 5004.2.1.

5005.2.1.4 Secondary containment for hazardous material liquids. Where required by Table 5005.2.1.4, buildings, rooms or areas where hazardous material liquids are dispensed or used in open systems shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 1.3 gallons (5 L).
2. Multiple vessels or systems: greater than 5.3 gallons (20 L).

TABLE 5005.2.1.4—REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE

MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE	
1. Physical-hazard materials			
Combustible liquids	Class II	See Chapter 57	See Chapter 57
	Class IIIA	See Chapter 57	See Chapter 57
	Class IIIB	See Chapter 57	See Chapter 57
Cryogenic fluids		See Chapter 55	See Chapter 55
Explosives		See Chapter 56	See Chapter 56
Flammable liquids	Class IA	See Chapter 57	See Chapter 57
	Class IB	See Chapter 57	See Chapter 57
	Class IC	See Chapter 57	See Chapter 57

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TABLE 5005.2.1.4—REQUIRED SECONDARY CONTAINMENT—HAZARDOUS MATERIAL LIQUIDS USE—continued			
MATERIAL	INDOOR LIQUIDS USE	OUTDOOR LIQUIDS USE	
Flammable solids		Not Applicable	Not Applicable
Organic peroxides	Unclassified Detonable	Required	Required
	Class I	Required	Required
	Class II		
	Class III		
	Class IV		
	Class V	Not Required	Not Required
Oxidizers	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1		
Pyrophorics		Required	Required
Unstable (reactives)	Class 4	Required	Required
	Class 3		
	Class 2		
	Class 1	Not Required	Required
Water reactives	Class 3	Required	Required
	Class 2		
	Class 1	Not Required	Required
2. Health-hazard materials			
Corrosives		Required	Required
Highly toxics			
Toxics			

5005.2.2 Closed systems. Use of hazardous materials in closed containers or systems shall be in accordance with Sections 5005.2.2.1 through 5005.2.2.4.

5005.2.2.1 Ventilation. Where closed systems are designed to be opened as part of normal operations, ventilation shall be provided in accordance with Section 5005.2.1.1.

5005.2.2.2 Explosion control. Explosion control shall be provided in accordance with Section 5004.6 where an explosive environment exists because of the hazardous materials dispensed or used, or as a result of the dispensing or use process.

Exception: Where process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions based on the most likely failure.

5005.2.2.3 Spill control for hazardous material liquids. Buildings, rooms or areas where hazardous material liquids are used in individual vessels exceeding a 55-gallon (208 L) capacity shall be provided with spill control in accordance with Section 5004.2.1.

5005.2.2.4 Secondary containment for hazardous material liquids. Where required by Table 5005.2.1.4, buildings, rooms or areas where hazardous material liquids are used in vessels or systems shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 55 gallons (208 L).
2. Multiple vessels or systems: greater than 1,000 gallons (3785 L).

5005.3 Outdoor dispensing and use. Dispensing and use of hazardous materials outdoors shall be in accordance with Sections 5005.3.1 through 5005.3.9.

5005.3.1 Quantities exceeding the maximum allowable quantity per control area. Outdoor dispensing or use of hazardous materials, in either closed or open containers or systems, in amounts exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001, 5003, 5005.1 and 5005.3.

5005.3.2 Quantities not exceeding the maximum allowable quantity per control area. Outdoor dispensing or use of hazardous materials, in either closed or open containers or systems, in amounts not exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

5005.3.3 Outdoor location. Outdoor dispensing and use areas for hazardous materials shall be located as required by Section 5003.12 except where material-specific requirements, including requirements in referenced standards, are provided in other chapters of this code.

5005.3.4 Spill control for hazardous material liquids in open systems. Outdoor areas where hazardous material liquids are dispensed in vessels exceeding a 1.3-gallon (5 L) capacity or used in open systems exceeding a 5.3-gallon (20 L) capacity shall be provided with spill control in accordance with Section 5004.2.1.

5005.3.5 Secondary containment for hazardous material liquids in open systems. Where required by Table 5005.2.1.4, outdoor areas where hazardous material liquids are dispensed or used in open systems shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 1.3 gallons (5 L).
2. Multiple vessels or systems: greater than 5.3 gallons (20 L).

5005.3.6 Spill control for hazardous material liquids in closed systems. Outdoor areas where hazardous material liquids are used in closed systems exceeding 55 gallons (208 L) shall be provided with spill control in accordance with Section 5004.2.1.

5005.3.7 Secondary containment for hazardous material liquids in closed systems. Where required by Table 5005.2.1.4, outdoor areas where hazardous material liquids are dispensed or used in closed systems shall be provided with secondary containment in accordance with Section 5004.2.2 where the capacity of an individual vessel or system or the capacity of multiple vessels or systems exceeds the following:

1. Individual vessel or system: greater than 55 gallons (208 L).
2. Multiple vessels or systems: greater than 1,000 gallons (3785 L).

5005.3.8 Clearance from combustibles. The area surrounding an outdoor dispensing or use area shall be kept clear of combustible materials and vegetation for a minimum distance of 30 feet (9144 mm).

5005.3.9 Weather protection. Where overhead noncombustible construction is provided for sheltering outdoor hazardous material use areas, such use shall not be considered indoor use where the area is constructed in accordance with the requirements for weather protection as required in the *California Building Code*.

Exception: Use of explosive materials shall be considered as indoor use.

5005.4 Handling. Handling of hazardous materials shall be in accordance with Sections 5005.4.1 through 5005.4.4.

5005.4.1 Quantities exceeding the maximum allowable quantity per control area. Handling of hazardous materials in indoor and outdoor locations in amounts exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(1) through 5003.1.1(4) shall be in accordance with Sections 5001, 5003, 5005.1 and 5005.4.

5005.4.2 Quantities not exceeding the maximum allowable quantity per control area. Handling of hazardous materials in indoor locations in amounts not exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(1) and 5003.1.1(2) shall be in accordance with Sections 5001, 5003 and 5005.1. Handling of hazardous materials in outdoor locations in amounts not exceeding the maximum allowable quantity per control area indicated in Tables 5003.1.1(3) and 5003.1.1(4) shall be in accordance with Sections 5001 and 5003.

5005.4.3 Outdoor location. Outdoor handling areas for hazardous materials shall be located as required by Section 5003.12 except where material-specific requirements, including requirements in referenced standards, are provided in other chapters of this code.

5005.4.4 Dispensing, use and handling. Where hazardous materials having a hazard ranking of 3 or 4 in accordance with NFPA 704 are transported through corridors, interior exit stairways or ramps or exit passageways, there shall be an emergency telephone system, a local manual alarm station or an approved alarm-initiating device at not more than 150-foot (45 720 mm) intervals and at each exit and exit access doorway throughout the transport route. The signal shall be relayed to an approved central, proprietary or remote station service or constantly attended on-site location and shall initiate a local audible alarm.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 51 – AEROSOLS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

51 AEROSOLS

User notes:

About this chapter: Chapter 51 provides requirements for the prevention, control and extinguishment of fires and explosions in facilities where retail aerosol products are displayed or stored. It is concerned with both life safety and property protection from a fire; however, historically, aerosol product fires have caused property loss more frequently than loss of life. Requirements for storing aerosol products are dependent on the level of aerosol product, level of sprinkler protection, type of storage condition and quantity of aerosol products.

SECTION 5101—GENERAL

5101.1 Scope. The provisions of this chapter, the *California Building Code* and NFPA 30B shall apply to the manufacturing, storage and display of aerosol products, aerosol cooking spray products and plastic aerosol 3 products. Manufacturing of aerosol products, aerosol cooking spray products and plastic aerosol 3 products using hazardous materials shall also comply with Chapter 50.

5101.2 Permit required. Permits shall be required as set forth in Section 105.5.

5101.3 Safety Data Sheets. Safety Data Sheet (SDS) information for aerosol products displayed shall be kept on the premises at an approved location.

5101.4 Containers. Metal aerosol containers shall be limited to a maximum size of 33.8 fluid ounces (1000 ml). Plastic aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml) except as provided in Sections 5104.1.1 and 5104.1.2. Glass aerosol containers shall be limited to a maximum of 4 fluid ounces (118 ml).

SECTION 5102—DEFINITIONS

5102.1 Definitions. The following terms are defined in Chapter 2:

AEROSOL CONTAINER.

AEROSOL PRODUCT.

Level 1 aerosol products.

Level 2 aerosol products.

Level 3 aerosol products.

AEROSOL PRODUCT WAREHOUSE.

PROPELLANT.

RETAIL DISPLAY AREA.

SECTION 5103—CLASSIFICATION OF AEROSOL PRODUCTS

5103.1 Classification levels. Aerosol products shall be classified as Level 1, 2 or 3 in accordance with Table 5103.1 and NFPA 30B. Aerosol products in cartons that are not identified in accordance with this section shall be classified as Level 3.

TABLE 5103.1—CLASSIFICATION OF AEROSOL PRODUCTS

CHEMICAL HEAT OF COMBUSTION		AEROSOL CLASSIFICATION
Greater than (Btu/lb)	Less than or equal to (Btu/lb)	
0	8,600	1
8,600	13,000	2
13,000	—	3

For SI: 1 British thermal unit per pound = 0.002326 kJ/g.

5103.2 Identification. Cartons or outer packaging shall be identified on not fewer than one exterior side with the classification level of the aerosol products contained within the carton.

5103.2.1 Aerosol products. Cartons or outer packaging containing aerosol products in metal containers or glass and plastic containers 4 fluid ounces. (118 ml) or less shall be clearly marked as follows:

LEVEL _____ AEROSOLS

5103.2.2 Aerosol cooking spray products. Cartons or outer packaging containing aerosol cooking spray products in metal containers shall be clearly marked as follows:

AEROSOL COOKING SPRAY

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5103.2.3 Plastic aerosol products. Cartons or outer packaging containing aerosol products in plastic containers greater than 4 fluid ounces (118 ml) shall be clearly marked as follows:

PLASTIC AEROSOL 1, 3 or X

SECTION 5104—INSIDE STORAGE OF AEROSOL PRODUCTS

5104.1 General. The inside storage of Level 2 and 3 aerosol products, aerosol cooking sprays and plastic aerosol 3 products shall comply with Sections 5104.2 through 5104.8 and NFPA 30B. Level 1 aerosol products and those aerosol products covered by Section 5104.1.1 shall be considered to be equivalent to a Class III commodity and shall comply with the requirements for palletized or rack storage in NFPA 13.

5104.1.1 Plastic aerosol 1 products. Aerosol products in plastic containers larger than 4 fluid ounces (118 ml), but not to exceed 33.8 fluid ounces (1000 ml), shall be allowed only where in accordance with this section. The commodity classification shall be Class III commodities, as defined in NFPA 13 where any of the following conditions are met:

1. Base product does not have a fire point where tested in accordance with ASTM D92, and nonflammable propellant.
2. Base product does not sustain combustion as tested in accordance with DOTn 49 CFR Part 173, Appendix H, and nonflammable propellant.
3. Base product contains up to 20 percent by volume (15.8 percent by weight) of ethanol, isopropyl alcohol or a combination thereof in an aqueous mix, and nonflammable propellant.
4. Base product contains 4 percent by weight or less of an emulsified flammable liquefied gas propellant within an aqueous base. The propellant shall remain emulsified for the life of the product. Where such propellant is not permanently emulsified, the propellant shall be nonflammable.

5104.1.2 Plastic aerosol 3 products. Plastic aerosol 3 products shall be defined as those that meet one of the following criteria:

1. Base product does not have a fire point where tested in accordance with ASTM D92, and there is not more than 10 percent by weight flammable propellant.
2. Base product does not sustain combustion as tested in accordance with DOTn 49 CFR 173, Appendix H, and there is not more than 10 percent by weight flammable propellant.
3. Base product contains 50 percent by volume or less of flammable or combustible water-miscible alcohols in an aqueous mix, and there is not more than 10 percent by weight of flammable propellant.

5104.1.3 Plastic aerosol X products. Plastic aerosol X products are those products, in containers larger than 4 fluid ounces (118 ml), that do not meet the criteria provided in Section 5104.1.1 or 5104.1.2.

5104.1.3.1 Storage, use or handling. The storage, use or handling of plastic aerosol X products shall be prohibited.

5104.2 Storage in Groups A, B, E, F, I and R. Storage of Level 2 and 3 aerosol and plastic aerosol 3 products in occupancies in Groups A, B, E, F, I and R shall be limited to the following maximum quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.

The maximum quantity shall be increased 100 percent where the excess quantity is stored in storage cabinets in accordance with Section 5704.3.2.

5104.2.1 Excess storage. Storage of quantities exceeding the maximum quantities indicated in Section 5104.2 shall be stored in separate inside flammable liquid storage rooms in accordance with Section 5104.5.

5104.2.2 Aerosol cooking spray products. Storage of aerosol cooking spray products in Group A, B, E, F, I and R occupancies shall not be more than 1,000 pounds (454 kg) net weight.

5104.3 Storage in general purpose warehouses. Aerosol product storage in general purpose warehouses utilized only for warehousing-type operations involving mixed commodities shall comply with Section 5104.3.1, 5104.3.2. or 5104.3.3.

5104.3.1 Nonsegregated storage. Storage consisting of solid pile, palletized or rack storage of Level 2 and 3 aerosol and plastic aerosol 3 products not segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.1.

TABLE 5104.3.1—NONSEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE WAREHOUSES[b]

AEROSOL LEVEL	MAXIMUM NET WEIGHT PER FLOOR (pounds)[b]			
	Palletized or solid-pile storage		Rack storage	
	Unprotected	Protected[a]	Unprotected	Protected[a]
2	2,500	12,000	2,500	24,000
3	1,000	12,000	1,000	24,000
Combination 2 and 3	2,500	12,000	2,500	24,000

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2.

a. Approved automatic sprinkler system protection and storage arrangements shall comply with NFPA 30B. Sprinkler system protection shall extend 20 feet beyond the storage area containing the aerosol products.

b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

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5104.3.2 Segregated storage. Storage of Level 2 and 3 aerosol and plastic aerosol 3 products segregated into areas utilized exclusively for the storage of aerosol products shall comply with Table 5104.3.2 and Sections 5104.3.2.1 and 5104.3.2.2.

TABLE 5104.3.2—SEGREGATED STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN GENERAL PURPOSE WAREHOUSES

STORAGE SEPARATION	MAXIMUM SEGREGATED STORAGE AREA[a]		AUTOMATIC SPRINKLER SYSTEM REQUIREMENTS
	Percentage of building area (percent)	Area limitation (square feet)	
Separation area[e, f]	15	20,000	Notes b, c
Chain-link fence enclosure[d]	20	20,000	Notes b, c
1-hour fire-resistance-rated interior walls	20	30,000	Note b
2-hour fire-resistance-rated interior walls	25	40,000	Note b
3-hour fire-resistance-rated interior walls	30	50,000	Note b

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. The maximum segregated storage area shall be limited to the smaller of the two areas resulting from the percentage of building area limitation and the area limitation.

b. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Building areas not containing aerosol product storage shall be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

c. Automatic sprinkler system protection in aerosol product storage areas shall comply with NFPA 30B and be approved. Sprinkler system protection shall extend a minimum 20 feet beyond the aerosol storage area.

d. Chain-link fence enclosures shall comply with Section 5104.3.2.1.

e. A separation area shall be defined as an area extending outward from the periphery of the segregated aerosol product storage area as follows:
   1. The limits of the aerosol product storage shall be clearly marked on the floor.
   2. The separation distance shall be not less than 25 feet and maintained clear of all materials with a commodity classification greater than Class III in accordance with Section 903.3.1.1.

f. Separation areas shall only be permitted where approved.

5104.3.2.1 Chain-link fence enclosures. Chain-link fence enclosures required by Table 5104.3.2 shall comply with the following:

1. The fence shall be not less than No. 9 gage steel wire, woven into a maximum 2-inch (51 mm) diamond mesh.
2. The fence shall be installed from the floor to the underside of the roof or ceiling above.
3. Class IV and high-hazard commodities shall be stored outside of the aerosol storage area and not less than 8 feet (2438 mm) from the fence.
4. Access openings in the fence shall be provided with either self- or automatic-closing devices or a labyrinth opening arrangement preventing aerosol containers from rocketing through the access openings.
5. Not less than two means of egress shall be provided from the fenced enclosure.

5104.3.2.2 Aisles. The minimum aisle requirements for segregated storage in general purpose warehouses shall comply with Table 5104.3.2.2.

TABLE 5104.3.2.2—SEGREGATED STORAGE AISLE WIDTHS AND DISTANCE TO AISLES IN GENERAL PURPOSE WAREHOUSES

STORAGE CONDITION	MINIMUM AISLE WIDTH (feet)	MAXIMUM DISTANCE FROM STORAGE TO AISLE (feet)
Solid pile or palletized[a]	4 feet between piles	25
Racks with ESFR sprinklers[a]	4 feet between racks and adjacent Level 2 and 3 aerosol product storage	25
Racks without ESFR sprinklers[a]	8 feet between racks and adjacent Level 2 and 3 aerosol product storage	25

For SI: 1 foot = 304.8 mm.

a. Sprinklers shall comply with NFPA 30B.

5104.3.3 Aerosol cooking spray products. Solid pile, palletized or rack storage of aerosol cooking spray products in a general purpose warehouse shall not be more than 2,500 pounds (1135 kg) net weight, unless protected in accordance with NFPA 30B.

5104.4 Storage in aerosol product warehouses. The total quantity of Level 2 and 3 aerosol products, aerosol cooking sprays and plastic aerosol 3 products in a warehouse utilized for the storage, shipping and receiving of aerosol products shall not be restricted in structures complying with Sections 5104.4.1 through 5104.4.4.

5104.4.1 Automatic sprinkler system. Aerosol product warehouses shall be protected by an approved wet-pipe automatic sprinkler system in accordance with NFPA 30B. Sprinkler protection shall be designed based on the highest classification level of aerosol product present.

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5104.4.2 Pile and palletized storage aisles. Solid pile and palletized storage shall be arranged so the maximum travel distance to an aisle is 25 feet (7620 mm). Aisles shall have a minimum width of 4 feet (1219 mm).

5104.4.3 Rack storage aisles. Rack storage shall be arranged with a minimum aisle width of 8 feet (2438 mm) between rows of racks and 8 feet (2438 mm) between racks and adjacent solid pile or palletized storage. Where early suppression fast-response (ESFR) sprinklers provide automatic sprinkler protection, the minimum aisle width shall be 4 feet (1219 mm).

5104.4.4 Combustible commodities. Combustible commodities other than flammable and combustible liquids shall be permitted to be stored in an aerosol product warehouse.

Exception: Flammable and combustible liquids in 1-quart (946 ml) metal containers and smaller shall be permitted to be stored in an aerosol product warehouse.

5104.5 Storage in inside flammable liquid storage rooms. Inside flammable liquid storage rooms shall comply with Section 5704.3.7. The maximum quantities of aerosol products shall comply with Section 5104.5.1 or 5104.5.2.

5104.5.1 Storage rooms of 500 square feet or less. The storage of aerosol products in flammable liquid storage rooms less than or equal to 500 square feet (46 m^2) in area shall not exceed the following quantities:

1. A net weight of 1,000 pounds (454 kg) of Level 2 aerosol products.
2. A net weight of 500 pounds (227 kg) of Level 3 aerosol and plastic aerosol 3 products.
3. A combined net weight of 1,000 pounds (454 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.

5104.5.2 Storage rooms greater than 500 square feet. The storage of aerosol products in flammable liquid storage rooms greater than 500 square feet (46 m^2) in area shall not exceed the following quantities:

1. A net weight of 2,500 pounds (1135 kg) of Level 2 aerosol products.
2. A net weight of 1,000 pounds (454 kg) of Level 3 aerosol products.
3. A combined net weight of 2,500 pounds (1135 kg) of Level 2 and 3 aerosol and plastic aerosol 3 products.

The maximum aggregate storage quantity of Level 2 and 3 aerosol products permitted in separate inside storage rooms protected by an approved automatic sprinkler system in accordance with NFPA 30B shall be 5,000 pounds (2270 kg).

5104.6 Storage in liquid warehouses. The storage of Level 2 and 3 aerosol products in liquid warehouses shall comply with NFPA 30B. The storage shall be located within segregated storage areas in accordance with Section 5104.3.2 and Sections 5104.6.1 through 5104.6.3.

5104.6.1 Containment. Spill control or drainage shall be provided to prevent the flow of liquid to within 8 feet (2438 mm) of the segregated storage area.

5104.6.2 Sprinkler design. Sprinkler protection shall be designed based on the highest level of aerosol product present.

5104.6.3 Opening protection into segregated storage areas. Fire doors or gates opening into the segregated storage area shall either be self-closing or provided with automatic-closing devices activated by sprinkler water flow or an approved fire detection system.

5104.7 Storage in Group M occupancies. Storage of Level 2 and 3 aerosol products, aerosol cooking spray products and plastic aerosol 3 products in occupancies in Group M shall comply with Table 5104.7. Retail display shall comply with Section 5106.

TABLE 5104.7—MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN RETAIL STORAGE AREAS

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Nonsegregated storage[a, b]	Segregated storage	
		Storage cabinets[b]	Separated from retail area[c]
Basement	Not Permitted	Not Permitted	Not Permitted
Ground	2,500	5,000	Note d
Upper	500	1,000	Note d

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2.

a. The total aggregate quantity on display and in storage shall not exceed the maximum retail display quantity indicated in Section 5106.3.

b. Storage quantities indicated are the maximum permitted in any 50,000-square-foot area.

c. The storage area shall be separated from the retail area with a 1-hour fire-resistance-rated assembly.

d. See Table 5104.3.2.

5104.8 Storage of aerosol cooking spray products. Aerosol cooking spray products shall be permitted to be stored in a general purpose warehouse.

5104.8.1 Mixed storage. Where aerosol cooking spray products are mixed with other higher-hazard aerosol products, the provided isolation, storage height restrictions and protection shall be based on the highest-hazard aerosol product present.

5104.8.2 Storage conditions. The storage and handling of aerosol cooking spray products shall comply with this chapter and NFPA 30B.

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SECTION 5105—OUTSIDE STORAGE

5105.1 General. The outside storage of Level 2 and 3 aerosol products and plastic aerosol 3 products, including storage in temporary storage trailers, shall be separated from exposures in accordance with Table 5105.1.

TABLE 5105.1—DISTANCE TO EXPOSURES FOR OUTSIDE STORAGE OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS

EXPOSURE	MINIMUM DISTANCE FROM AEROSOL STORAGE (feet)[a]
Buildings	50
Exit discharge to a public way	50
Lot lines	20
Other outside storage	50
Public alleys, public ways, public streets	20

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The minimum separation distance indicated is not required where exterior walls having a 2-hour fire-resistance rating without penetrations separate the storage from the exposure. The walls shall extend not less than 30 inches above and to the sides of Level 2 and 3 aerosol products and plastic aerosol 3 products.

SECTION 5106—RETAIL DISPLAY

5106.1 General. This section shall apply to the retail display of 500 pounds (227 kg) or more of Level 2 and 3 aerosol products, aerosol cooking spray products and plastic aerosol 3 products.

5106.2 Aerosol display and normal merchandising not exceeding 8 feet in height. Aerosol display and normal merchandising not exceeding 8 feet (2438 mm) in height shall be in accordance with Sections 5106.2.1 through 5106.2.5.

5106.2.1 Maximum quantities in retail display areas. Aerosol products, aerosol cooking spray products and plastic aerosol 3 products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities in Table 5106.2.1.

TABLE 5106.2.1—MAXIMUM QUANTITIES OF LEVEL 2 AND 3 AEROSOL PRODUCTS, AEROSOL COOKING SPRAY PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS IN RETAIL DISPLAY AREAS

	MAXIMUM NET WEIGHT PER FLOOR (pounds)[b]		
Floor	Unprotected[a]	Protected in accordance with Section 5106.2[a, c]	Protected in accordance with Section 5106.3[c]
Basement	Not Allowed	500	500
Ground	2,500	10,000	10,000
Upper	500	2,000	Not Allowed

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2.

a. The total quantity shall not exceed 1,000 pounds net weight in any one 100-square-foot retail display area.

b. Per 25,000-square-foot retail display area.

c. Minimum Ordinary Hazard Group 2 wet-pipe automatic sprinkler system throughout the retail sales occupancy.

5106.2.2 Aerosol cooking spray product storage and fire protection. The storage and handling of aerosol cooking spray products shall comply with this chapter and NFPA 30B.

5106.2.3 Display of aerosol products. Level 2 and 3 aerosol and plastic aerosol 3 products shall not be stacked more than 6 feet (1829 mm) high from the base of the aerosol product array to the top of the aerosol product array unless the aerosol products are placed on fixed shelving or otherwise secured in an approved manner. Where storage or retail display is on shelves, the height of such storage or retail display to the top of aerosol products shall not exceed 8 feet (2438 mm).

5106.2.4 Combustible cartons. Aerosol products located in retail display areas shall be removed from combustible cartons.

Exceptions:

1. Display areas that use a portion of combustible cartons that consist of only the bottom panel and not more than 2 inches (51 mm) of the side panel are allowed.
2. Where the display area is protected in accordance with Tables 7.4.2.7(a) through 7.4.2.7(l) of NFPA 30B, storage of aerosol products in combustible cartons is allowed.

5106.2.5 Retail display automatic sprinkler system. Where an automatic sprinkler system is required for the protected retail display of aerosol products, the wet-pipe automatic sprinkler system shall be in accordance with Section 903.3.1.1. The minimum system design shall be for an Ordinary Hazard Group 2 occupancy. The system shall be provided throughout the retail display area.

5106.3 Aerosol product display and normal merchandising exceeding 8 feet in height. Aerosol product display and merchandising exceeding 8 feet (2438 mm) in height shall be in accordance with Sections 5106.3.1 through 5106.3.3.

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5106.3.1 Maximum quantities in retail display areas. Aerosol products in retail display areas shall not exceed quantities needed for display and normal merchandising and shall not exceed the quantities in Table 5106.2.1, with fire protection in accordance with Section 5106.3.2.

5106.3.2 Automatic sprinkler protection. Aerosol product and plastic aerosol 3 product display and merchandising areas shall be protected by an automatic sprinkler system based on the requirements set forth in Tables 7.4.2.7(a) through 7.4.2.7(l) of NFPA 30B and the following:

1. Protection shall be based on the highest level of aerosol product in the array and the packaging method of the storage located more than 6 feet (1829 mm) above the finished floor.
2. Where using the cartoned aerosol products tables of NFPA 30B, uncartoned or display-cut Level 2 and 3 aerosol products and plastic aerosol 3 products shall not be permitted more than 6 feet (1829 mm) above the finished floor.
3. The design area for Level 2 and 3 aerosol products and plastic aerosol 3 products shall extend not less than 20 feet (6096 mm) beyond the Level 2 and 3 aerosol product and plastic aerosol 3 product display and merchandising areas.
4. Where ordinary and high-temperature ceiling sprinkler systems are adjacent to each other, noncombustible draft curtains shall be installed at the interface.

5106.3.3 Separation of Level 2 and 3 aerosol product and plastic aerosol 3 product areas. Separation of Level 2 and 3 aerosol product areas or plastic aerosol 3 product areas shall comply with the following:

1. Level 2 and 3 aerosol product or plastic aerosol 3 product display and merchandising areas shall be separated from each other by not less than 25 feet (7620 mm). See Table 5106.2.1.
2. Level 2 and 3 aerosol product or plastic aerosol 3 product display and merchandising areas shall be separated from flammable and combustible liquids storage and display areas by one or a combination of the following:
   2.1. Segregating areas from each other by horizontal distance of not less than 25 feet (7620 mm).
   2.2. Isolating areas from each other by a noncombustible partition extending not less than 18 inches (457 mm) above the merchandise.
   2.3. In accordance with Section 5106.5.
3. Where Item 2.2 is used to separate Level 2 or 3 aerosol products or plastic aerosol 3 products from flammable or combustible liquids, and the aerosol products are located within 25 feet (7620 mm) of flammable or combustible liquids, the area below the noncombustible partition shall be liquid tight at the floor to prevent spilled liquids from flowing beneath the aerosol products.

5106.4 Maximum quantities in storage areas. Aerosol products in storage areas adjacent to retail display areas shall not exceed the quantities in Table 5106.4.

TABLE 5106.4—MAXIMUM STORAGE QUANTITIES FOR STORAGE AREAS ADJACENT TO RETAIL DISPLAY OF LEVEL 2 AND 3 AEROSOL PRODUCTS AND PLASTIC AEROSOL 3 PRODUCTS

MAXIMUM NET WEIGHT PER FLOOR (pounds)			
Floor	Unseparated[a, b]	Separated	
		Storage cabinets[b]	1-hour occupancy separation
Basement	Not Allowed	Not Allowed	Not Allowed
Ground	2,500	5,000	In accordance with Sections 6.4.4.3 and 6.4.4.4 of NFPA 30B
Upper	500	1,000	In accordance with Sections 6.4.4.3 and 6.4.4.4 of NFPA 30B

For SI: 1 pound = 0.454 kg, 1 square foot = 0.0929 m^2.
a. The aggregate quantity in storage and retail display shall not exceed the quantity limits for retail display.
b. In any 50,000-square-foot area.

5106.5 Special protection design for Level 2 and 3 aerosol products adjacent to flammable and combustible liquids in double-row racks. The display and merchandising of Level 2 and 3 aerosol products adjacent to flammable and combustible liquids in double-row racks shall be in accordance with Section 5106.3.3 or Sections 5106.5.1 through 5106.5.8.

5106.5.1 Fire protection. Fire protection for the display and merchandising of Level 2 and 3 aerosols in double-row racks shall be in accordance with Table 8.5.1 and Figure 8.5.1 of NFPA 30B.

5106.5.2 Cartoned aerosol products. Level 2 and 3 aerosol products displayed or merchandised more than 8 feet (2438 mm) above the finished floor shall be in cartons.

5106.5.3 Shelving. Shelving in racks shall be limited to wire mesh shelving having uniform openings not more than 6 inches (152 mm) apart, with the openings comprising not less than 50 percent of the overall shelf area.

5106.5.4 Aisles. Racks shall be arranged so that aisles not less than $7^1/_2$ feet (2286 mm) wide are maintained between rows of racks and adjacent solid-piled or palletized merchandise.

5106.5.5 Flue spaces. Flue spaces in racks shall comply with the following:

1. Transverse flue spaces—Nominal 3-inch (76 mm) transverse flue spaces shall be maintained between merchandise and rack uprights.

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2. Longitudinal flue spaces—Nominal 6-inch (152 mm) longitudinal flue spaces shall be maintained.

5106.5.6 Horizontal barriers. Horizontal barriers constructed of minimum $^{3}/_{8}$-inch-thick (10 mm) plywood or minimum 0.034-inch (0.086 mm) (No. 22 gage) sheet metal shall be provided and located in accordance with Table 8.5.1 and Figure 8.5.1 of NFPA 30B where in-rack sprinklers are installed.

5106.5.7 Class I, II, III, IV and plastic commodities. Class I, II, III, IV and plastic commodities located adjacent to Level 2 and 3 aerosol products and plastic aerosol 3 products shall be protected in accordance with NFPA 13.

5106.5.8 Flammable and combustible liquids. Class I, II, III A and III B liquids shall be allowed to be located adjacent to Level 2 and 3 aerosol products where both of the following conditions are met:

1. Class I, II, IIIA and IIIB liquid containers: Containers for Class I, II, IIIA and IIIB liquids shall be limited to 1.06-gallon (4 L) metal-relieving and nonrelieving style containers and 5.3-gallon (20 L) metal-relieving style containers.
2. Fire protection for Class I, II, IIIA and IIIB Liquids: Automatic sprinkler protection for Class I, II, IIIA and IIIB liquids shall be in accordance with Chapter 57.

SECTION 5107—MANUFACTURING FACILITIES

5107.1 General. Manufacturing facilities shall be in accordance with NFPA 30B.

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CHAPTER
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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 53 – COMPRESSED GASES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
[T-19 §3.18 (a)(b)]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

53 COMPRESSED GASES

User notes:

About this chapter: Chapter 53 regulates the storage, use and handling of all flammable and nonflammable compressed gases, such as those that are used in medical facilities, air separation plants, industrial plants, agricultural equipment and similar occupancies. Also, this chapter regulates inert gases, such as CO_2 used for enrichment and beverage dispensing, that although inert are considered asphyxiants and in larger amounts pose a life safety hazard. Standards for the design, construction and marking of compressed gas cylinders and pressure vessels are referenced. Compressed gases used in welding and cutting, cryogenic liquids and liquefied petroleum gases are also regulated under Chapters 35, 55 and 61, respectively. Compressed gases that are classified as hazardous materials are also regulated in Chapter 50, which includes general requirements.

SECTION 5301—GENERAL

5301.1 Scope. Storage, use and handling of compressed gases in compressed gas containers, cylinders, tanks and systems shall comply with this chapter and NFPA 55, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.

Compressed gases classified as hazardous materials shall also comply with Chapter 50 for general requirements and chapters addressing specific hazards, including Chapters 58 (Flammable Gases and Flammable Cryogenic Fluids), 60 (Highly Toxic and Toxic Materials), 63 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 64 (Pyrophoric Materials).

Compressed hydrogen (CH_2) shall also comply with the applicable portions of Chapters 23 and 58 of this code, the *International Fuel Gas Code* and NFPA 2.

Cutting and welding gases shall also comply with Chapter 35.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 608).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 23, the *International Fuel Gas Code* and NFPA 52.
3. Cryogenic fluids shall comply with Chapter 55.
4. LP-gas shall comply with Chapter 61 and the *International Fuel Gas Code*.

[California Code of Regulations, Title 19, Division 1, §3.18(a) and (b)] Hazardous Areas.

(a) General. Occupancies or portions thereof used or intended to be used as operating rooms, surgeries, delivery rooms, storage rooms and similar hazardous locations in which flammable or nonflammable mixtures of gases are used or stored shall be maintained in accordance with the provisions of NFPA 99-2005 Inhalation Anesthetics, NFPA 99-2005 Laboratories, NFPA 99-2005 Hyperbaric Facilities, NFPA 55-2010 Bulk Oxygen Systems at Consumer Sites, and this section.

(b) Containers. Cylinders and fittings for compressed gases shall conform to the regulations of the Federal Department of Transportation.

Compressed gas cylinders shall be clearly marked with the name of the gas contained therein. Cylinders shall bear color makings and labels conforming to the following:

Gas	***Color***
(1) Oxygen	*Green*
(2) Carbon Dioxide	*Gray*
(3) Nitrous Oxide	*Light Blue*
(4) Cyclopropan	*Orange*
(5) Helium	*Brown*
(6) Ethlene	*Red*
(7) Carbon Dioxide and Oxygen	*Gray and Green*
(8) Helium and Oxygen	*Brown and Green*

Note: Polished metal or chrome-plated cylinders shall have color tags in addition to color labels.

When deemed necessary by the enforcing agency, compressed gas cylinders shall be secured by chains, metal straps or other approved materials to prevent overturning.

5301.2 Permits. Permits shall be required as set forth in Section 105.5.

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SECTION 5302—DEFINITIONS

5302.1 Definitions. The following terms are defined in Chapter 2:

COMPRESSED GAS.

COMPRESSED GAS CONTAINER.

COMPRESSED GAS SYSTEM.

NESTING.

TUBE TRAILER.

SECTION 5303—GENERAL REQUIREMENTS

5303.1 Containers, cylinders and tanks. Compressed gas containers, cylinders and tanks shall comply with this section. Compressed gas containers, cylinders or tanks that are not designed for refillable use shall not be refilled after use of the original contents.

5303.2 Design and construction. Compressed gas containers, cylinders and tanks shall be designed, fabricated, tested, marked with the specifications of manufacture and maintained in accordance with the regulations of DOTn 49 CFR Parts 100–185 or the ASME *Boiler and Pressure Vessel Code*, Section VIII.

5303.3 Pressure relief devices. Pressure relief devices shall be in accordance with Sections 5303.3.1 through 5303.3.5.

5303.3.1 Where required. Pressure relief devices shall be provided to protect containers, cylinders and tanks containing compressed gases from rupture in the event of overpressure.

Exception: Cylinders, containers and tanks where exempt from the requirements for pressure relief devices specified by the standards of design listed in Section 5303.3.2.

5303.3.2 Design. Pressure relief devices to protect containers shall be designed and provided in accordance with CGA S-1.1, CGA S-1.2, CGA S-1.3 or the ASME *Boiler and Pressure Vessel Code*, Section VIII, as applicable.

5303.3.3 Sizing. Pressure relief devices shall be sized in accordance with the specifications to which the container was fabricated and to material-specific requirements as applicable.

5303.3.4 Arrangement. Pressure relief devices shall be arranged to discharge upward and unobstructed to the open air in such a manner as to prevent any impingement of escaping gas upon the container, adjacent structures or personnel.

Exception: DOTn specification containers having an internal volume of 30 cubic feet (0.855 m^3) or less.

5303.3.5 Freeze protection. Pressure relief devices or vent piping shall be designed or located so that moisture cannot collect and freeze in a manner that would interfere with the operation of the device.

5303.4 Marking. Stationary and portable compressed gas containers, cylinders, tanks and systems shall be marked in accordance with Sections 5303.4.1 through 5303.4.3.

5303.4.1 Stationary compressed gas containers, cylinders and tanks. Stationary compressed gas containers, cylinders and tanks shall be marked with the name of the gas and in accordance with Sections 5003.5 and 5003.6. Markings shall be visible from any direction of approach.

5303.4.2 Portable containers, cylinders and tanks. Portable compressed gas containers, cylinders and tanks shall be marked in accordance with CGA C-7.

5303.4.3 Piping systems. Piping systems shall be marked in accordance with ASME A13.1. Markings used for piping systems shall consist of the content's name and include a direction-of-flow arrow. Markings shall be provided at each valve; at wall, floor or ceiling penetrations; at each change of direction; and at not less than every 20 feet (6096 mm) or fraction thereof throughout the piping run.

Exceptions:

1. Piping that is designed or intended to carry more than one gas at various times shall have appropriate signs or markings posted at the manifold, along the piping and at each point of use to provide clear identification and warning.
2. Piping within gas manufacturing plants, gas processing plants, refineries and similar occupancies shall be marked in an approved manner.

5303.5 Security. Compressed gas containers, cylinders, tanks and systems shall be secured against accidental dislodgement and against access by unauthorized personnel in accordance with Sections 5303.5.1 through 5303.5.3.

5303.5.1 Security of areas. Areas used for the storage, use and handling of compressed gas containers, cylinders, tanks and systems shall be secured against unauthorized entry and safeguarded in an approved manner.

5303.5.2 Physical protection. Compressed gas containers, cylinders, tanks and systems that could be exposed to physical damage shall be protected. Guard posts or other approved means shall be provided to protect compressed gas containers, cylinders, tanks and systems indoors and outdoors from vehicular damage and shall comply with Section 312.

5303.5.3 Securing compressed gas containers, cylinders and tanks. Compressed gas containers, cylinders and tanks shall be secured to prevent falling caused by contact, vibration or seismic activity. Securing of compressed gas containers, cylinders and tanks shall be by one of the following methods:

1. Securing containers, cylinders and tanks to a fixed object with one or more restraints.

2. Securing containers, cylinders and tanks on a cart or other mobile device designed for the movement of compressed gas containers, cylinders or tanks.
3. Nesting of compressed gas containers, cylinders and tanks at container filling or servicing facilities or in sellers' warehouses not open to the public. Nesting shall be allowed provided that the nested containers, cylinders or tanks, if dislodged, do not obstruct the required means of egress.
4. Securing of compressed gas containers, cylinders and tanks to or within a rack, framework, cabinet or similar assembly designed for such use.

Exception: Compressed gas containers, cylinders and tanks in the process of examination, filling, transport or servicing.

5303.6 Valve protection. Compressed gas container, cylinder and tank valves shall be protected from physical damage by means of protective caps, collars or similar devices in accordance with Sections 5303.6.1 and 5303.6.2.

5303.6.1 Compressed gas container, cylinder or tank protective caps or collars. Compressed gas containers, cylinders and tanks designed for protective caps, collars or other protective devices shall have the caps or devices in place except when the containers, cylinders or tanks are in use or are being serviced or filled.

5303.6.2 Caps and plugs. Compressed gas containers, cylinders and tanks designed for valve protection caps or other protective devices shall have the caps or devices in place. When outlet caps or plugs are installed, they shall be in place.

Exception: Compressed gas containers, cylinders or tanks in use, being serviced or being filled.

5303.7 Separation from hazardous conditions. Compressed gas containers, cylinders and tanks and systems in storage or use shall be separated from materials and conditions that pose exposure hazards to or from each other. Compressed gas containers, cylinders, tanks and systems in storage or use shall be separated in accordance with Sections 5303.7.1 through 5303.7.11.2.

5303.7.1 Incompatible materials. Compressed gas containers, cylinders and tanks shall be separated from each other based on the hazard class of their contents. Compressed gas containers, cylinders and tanks shall be separated from incompatible materials in accordance with Section 5003.9.8.

5303.7.2 Combustible waste, vegetation and similar materials. Combustible waste, vegetation and similar materials shall be kept not less than 10 feet (3048 mm) from compressed gas containers, cylinders, tanks and systems. A noncombustible partition, without openings or penetrations and extending not less than 18 inches (457 mm) above and to the sides of the storage area is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

5303.7.3 Ledges, platforms and elevators. Compressed gas containers, cylinders and tanks shall not be placed near elevators, unprotected platform ledges or other areas where falling would result in compressed gas containers, cylinders or tanks being allowed to drop distances exceeding one-half the height of the container, cylinder or tank.

5303.7.4 Temperature extremes. Compressed gas containers, cylinders and tanks, whether full or partially full, shall not be exposed to artificially created high temperatures exceeding 125°F (52°C) or subambient (low) temperatures unless designed for use under the exposed conditions.

5303.7.5 Falling objects. Compressed gas containers, cylinders, tanks and systems shall not be placed in areas where they are capable of being damaged by falling objects.

5303.7.6 Heating. Compressed gas containers, cylinders and tanks, whether full or partially full, shall not be heated by devices that could raise the surface temperature of the container, cylinder or tank to above 125°F (52°C). Heating devices shall comply with the *California Mechanical Code* and *the California Electrical Code*. Approved heating methods involving temperatures of less than 125°F (52°C) are allowed to be used by trained personnel. Devices designed to maintain individual compressed gas containers, cylinders or tanks at constant temperature shall be approved and shall be designed to be fail-safe.

5303.7.7 Sources of ignition. Open flames and high-temperature devices shall not be used in a manner that creates a hazardous condition.

5303.7.8 Exposure to chemicals. Compressed gas containers, cylinders, tanks and systems shall not be exposed to corrosive chemicals or fumes that could damage containers, cylinders, tanks, valves or valve-protective caps.

5303.7.9 Exhausted enclosures. Where exhausted enclosures are provided as a means to segregate compressed gas containers, cylinders and tanks from exposure hazards, such enclosures shall comply with the requirements of Section 5003.8.5.

5303.7.10 Gas cabinets. Where gas cabinets are provided as a means to separate compressed gas containers, cylinders and tanks from exposure hazards, such gas cabinets shall comply with the requirements of Section 5003.8.6.

5303.7.11 Tube trailers. Tube trailers, including those containing compatible compressed gases, shall be surrounded by a clear space of not less than 3 feet (914 mm) to allow for maintenance, access and inspection.

5303.7.11.1 Individual tube trailers containing incompatible materials. Increased separation distances between individual tube trailers containing incompatible gases shall be provided where required by Section 5303.7.1.

5303.7.11.2 Connections. Piping systems used to connect tube trailers to a user piping system shall not be viewed as an encroachment into the 3-foot (914 mm) clear space.

5303.8 Wiring and equipment. Electrical wiring and equipment shall comply with *the California Electrical Code*. Compressed gas containers, cylinders, tanks and systems shall not be located where they could become part of an electrical circuit. Compressed gas containers, cylinders, tanks and systems shall not be used for electrical grounding.

5303.9 Service and repair. Service, repair, modification or removal of valves, pressure-relief devices or other compressed gas container, cylinder or tank appurtenances shall be performed by trained personnel.

5303.10 Unauthorized use. Compressed gas containers, cylinders, tanks and systems shall not be used for any purpose other than to serve as a vessel for containing the product that it is designed to contain.

5303.11 Exposure to fire. Compressed gas containers, cylinders and tanks that have been exposed to fire shall be removed from service. Containers, cylinders and tanks so removed shall be handled by approved, qualified persons.

5303.12 Leaks, damage or corrosion. Leaking, damaged or corroded compressed gas containers, cylinders and tanks shall be removed from service. Leaking, damaged or corroded compressed gas systems shall be replaced or repaired in accordance with the following:

1. Compressed gas containers, cylinders and tanks that have been removed from service shall be handled in an approved manner.
2. Compressed gas systems that are determined to be leaking, damaged or corroded shall be repaired to a serviceable condition or removed from service.

5303.13 Surface of unprotected storage or use areas. Unless otherwise specified in Section 5303.14, compressed gas containers, cylinders and tanks are allowed to be stored or used without being placed under overhead cover. To prevent bottom corrosion, containers, cylinders and tanks shall be protected from direct contact with soil or unimproved surfaces. The surface of the area on which the containers are placed shall be graded to prevent accumulation of water.

5303.14 Overhead cover. Compressed gas containers, cylinders and tanks are allowed to be stored or used in the sun except in locations where extreme temperatures prevail. Where extreme temperatures prevail, overhead covers shall be provided.

5303.15 Lighting. Approved lighting by natural or artificial means shall be provided.

5303.16 Vaults. Generation, compression, storage and dispensing equipment for compressed gases shall be allowed to be located in either above- or below-grade vaults complying with Sections 5303.16.1 through 5303.16.14.

5303.16.1 Listing required. Vaults shall be listed by a nationally recognized testing laboratory.

Exception: Where approved by the fire code official, below-grade vaults are allowed to be constructed on site, provided that the design is in accordance with the *California Building Code* and that special inspections are conducted to verify structural strength and compliance of the installation with the approved design in accordance with Section 1707 of the *California Building Code*. Installation plans for below-grade vaults that are constructed on site shall be prepared by, and the design shall bear the stamp of, a professional engineer. Consideration shall be given to soil and hydrostatic loading on the floors, walls and lid; anticipated seismic forces; uplifting by ground water or flooding; and to loads imposed from above, such as traffic and equipment loading on the vault lid.

5303.16.2 Design and construction. The vault shall completely enclose generation, compression, storage or dispensing equipment located in the vault. There shall not be openings in the vault enclosure except those necessary for vault ventilation and access, inspection, filling, emptying or venting of equipment in the vault. The walls and floor of the vault shall be constructed of reinforced concrete not less than 6 inches (152 mm) thick. The top of an above-grade vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault to ensure that the thrust of any explosion occurring inside the vault is directed upward.

The top of an at- or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault. The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. The walls and floor of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading. Vaults shall be designed to be wind and earthquake resistant, in accordance with the *California Building Code*.

5303.16.3 Secondary containment. Vaults shall be substantially liquid-tight and there shall not be backfill within the vault. The vault floor shall drain to a sump. For premanufactured vaults, liquid tightness shall be certified as part of the listing provided by a nationally recognized testing laboratory. For field-erected vaults, liquid tightness shall be certified in an approved manner.

5303.16.4 Internal clearance. There shall be sufficient clearance within the vault to allow for visual inspection and maintenance of equipment in the vault.

5303.16.5 Anchoring. Vaults and equipment contained therein shall be suitably anchored to withstand uplifting by groundwater or flooding. The design shall verify that uplifting is prevented even where equipment within the vault is empty.

5303.16.6 Vehicle impact protection. Vaults shall be resistant to damage from the impact of a motor vehicle, or vehicle impact protection shall be provided in accordance with Section 312.

5303.16.7 Arrangement. Equipment in vaults shall be listed or approved for above-ground use. Where multiple vaults are provided, adjacent vaults shall be allowed to share a common wall. The common wall shall be liquid and vapor tight and shall be designed to withstand the load imposed when the vault on either side of the wall is filled with water.

5303.16.8 Connections. Connections shall be provided to permit the venting of each vault to dilute, disperse and remove vapors prior to personnel entering the vault.

5303.16.9 Ventilation. Vaults shall be provided with an exhaust ventilation system installed in accordance with Section 5004.3. The ventilation system shall operate continuously or be designed to operate upon activation of the vapor or liquid detection system. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot

[0.00508 $m^3/(s \times m^2)$] of floor area, but not less than 150 cfm (4 m^3/min). The exhaust system shall be designed to provide air movement across all parts of the vault floor for gases having a density greater than air and across all parts of the vault ceiling for gases having a density less than air. Supply ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm), of the floor. Exhaust ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm) of the floor or ceiling, for heavier-than-air or lighter-than-air gases, respectively. The exhaust system shall be installed in accordance with the *California Mechanical Code*.

5303.16.10 Monitoring and detection. Vaults shall be provided with approved vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup. Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) or one-half the immediately dangerous to life and health (IDLH) concentration for the gas in the vault. Vapor detectors shall be located not higher than 12 inches (305 mm) above the lowest point in the vault for heavier-than-air gases and not lower than 12 inches (305 mm) below the highest point in the vault for lighter-than-air gases. Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturer's instructions. Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an approved, constantly attended location within the facility served by the tanks or at an approved location. Activation of vapor detection systems shall shut off gas-handling equipment in the vault and dispensers.

5303.16.11 Liquid removal. Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, it shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1, locations, as defined in *the California Electrical Code.*

5303.16.12 Relief vents. Vent pipes for equipment in the vault shall terminate not less than 12 feet (3658 mm) above ground level.

5303.16.13 Accessway. Vaults shall be provided with an approved personnel accessway with a minimum dimension of 30 inches (762 mm) and with a permanently affixed, nonferrous ladder. Accessways shall be designed to be nonsparking. Travel distance from any point inside a vault to an accessway shall not exceed 20 feet (6096 mm). At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Entry points shall be secured against unauthorized entry and vandalism.

5303.16.14 Classified area. The interior of a vault containing a flammable gas shall be designated a Class I, Division 1, location, as defined in *the California Electrical Code.*

SECTION 5304—STORAGE OF COMPRESSED GASES

5304.1 Upright storage. Compressed gas containers, cylinders and tanks, except those designed for use in a horizontal position, and all compressed gas containers, cylinders and tanks containing nonliquefied gases, shall be stored in an upright position with the valve end up. An upright position shall include conditions where the container, cylinder or tank axis is inclined as much as 45 degrees (0.80 rad) from the vertical.

Exceptions:

1. Compressed gas containers with a water volume less than 1.3 gallons (5 L) are allowed to be stored in a horizontal position.
2. Cylinders, containers and tanks containing nonflammable gases, or cylinders, containers and tanks containing nonliquefied flammable gases that have been secured to a pallet for transportation purposes.

5304.2 Material-specific regulations. In addition to the requirements of this section, indoor and outdoor storage of compressed gases shall comply with the material-specific provisions of Chapters 54, 58 and 60 through 67.

SECTION 5305—USE AND HANDLING OF COMPRESSED GASES

5305.1 Compressed gas systems. Compressed gas systems shall be suitable for the use intended and shall be designed by persons competent in such design. Compressed gas equipment, machinery and processes shall be listed or approved.

5305.2 Controls. Compressed gas system controls shall be designed to prevent materials from entering or leaving process or reaction systems at other than the intended time, rate or path. Automatic controls shall be designed to be fail-safe.

5305.3 Piping systems. Piping, including tubing, valves, fittings and pressure regulators, shall comply with this section and Chapter 50. Piping, tubing, pressure regulators, valves and other apparatus shall be kept gas tight to prevent leakage.

5305.4 Valves. Valves utilized on compressed gas systems shall be suitable for the use intended. Access to such valves shall be provided and maintained. Valve handles or operators for required shutoff valves shall not be removed or otherwise altered to prevent access.

5305.5 Venting. Venting of gases shall be directed to an approved location. Venting shall comply with the *California Mechanical Code*.

5305.6 Upright use. Compressed gas containers, cylinders and tanks, except those designed for use in a horizontal position, and all compressed gas containers, cylinders and tanks containing nonliquefied gases, shall be used in an upright position with the valve end up. An upright position shall include conditions where the container, cylinder or tank axis is inclined as much as 45 degrees (0.80 rad) from the vertical. Use of nonflammable liquefied gases in the inverted position where the liquid phase is used shall not be

prohibited provided that the container, cylinder or tank is properly secured and the dispensing apparatus is designed for liquefied gas use.

Exception: Compressed gas containers, cylinders and tanks with a water volume less than 1.3 gallons (5 L) are allowed to be used in a horizontal position.

5305.7 Transfer. Transfer of gases between containers, cylinders and tanks shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1.

Exception: The fueling of vehicles with CNG or CH_2, conducted in accordance with Chapter 23.

5305.8 Use of compressed gas for inflation. Inflatable equipment, devices or balloons shall only be pressurized or filled with compressed air or inert gases.

5305.9 Material-specific regulations. In addition to the requirements of this section, indoor and outdoor use of compressed gases shall comply with the material-specific provisions of Chapters 54, 58 and 60 through 67.

5305.10 Handling. The handling of compressed gas containers, cylinders and tanks shall comply with Sections 5305.10.1 and 5305.10.2.

5305.10.1 Carts and trucks. Containers, cylinders and tanks shall be moved using an approved method. Where containers, cylinders or tanks are moved by hand cart, hand truck or other mobile device, such carts, trucks or devices shall be designed for the secure movement of containers, cylinders or tanks. Carts and trucks utilized for transport of compressed gas containers, cylinders and tanks within buildings shall comply with Section 5003.10. Carts and trucks utilized for transport of compressed gas containers, cylinders and tanks exterior to buildings shall be designed so that the containers, cylinders and tanks will be secured against dropping or otherwise striking against each other or other surfaces.

5305.10.2 Lifting devices. Ropes, chains or slings shall not be used to suspend compressed gas containers, cylinders and tanks unless provisions at time of manufacture have been made on the container, cylinder or tank for appropriate lifting attachments, such as lugs.

SECTION 5306—MEDICAL GASES

5306.1 General. Medical gases at health care-related facilities intended for patient or veterinary care shall comply with Sections 5306.2 through 5306.5 in addition to other requirements of this chapter and Section 427 of the *California Building Code*.

5306.1.1 Training. Personnel who handle medical gases and associated equipment and cylinders shall be trained on the use, safe handling and associated hazards.

5306.2 Interior supply location. Medical gases shall be located in areas dedicated to the storage of such gases without other storage or uses. Rooms containing medical gases shall be labeled in accordance with NFPA 99. Where containers of medical gases in quantities greater than the permit amount are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 5306.2.1, 5306.2.2 or 5306.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Section 5003.1 shall be in accordance with the *California Building Code* for high-hazard Group H occupancies.

5306.2.1 One-hour exterior rooms. A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. Rooms shall have not less than one exterior wall that is provided with not less than two vents. Each vent shall have a minimum free opening area of 36 square inches (232 cm^2) for each 1,000 cubic feet (28 m^3) at normal temperature and pressure (NTP) of gas stored in the room and shall be not less than 72 square inches (465 cm^2) in aggregate free opening area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with not less than one automatic sprinkler to provide container cooling in case of fire.

5306.2.2 One-hour interior room. Where an exterior wall cannot be provided for the room, a 1-hour interior room shall be provided and shall be a room or enclosure separated from the remainder of the building by fire barriers constructed in accordance with Section 707 of the *California Building Code* or horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be provided with self-closing, smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. An automatic sprinkler system shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall comply with the *California Mechanical Code* and be provided at a minimum rate of 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of the area of the room.

5306.2.3 Gas cabinets. Gas cabinets shall be constructed in accordance with Section 5003.8.6 and shall comply with the following:

1. Exhausted to the exterior through dedicated exhaust duct system installed in accordance with Chapter 5 of the *California Mechanical Code*.
2. Supply and exhaust ducts shall be enclosed in a 1-hour fire-resistance-rated shaft enclosure from the cabinet to the exterior. The average velocity of ventilation at the face of access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with not less than 150 feet per minute (0.76 m/s) at any point of the access port or window.

3. Provided with an automatic sprinkler system internal to the cabinet.

5306.3 Exterior supply locations. Oxidizer medical gas systems located on the exterior of a building with quantities greater than the permit amount shall be located in accordance with Section 6304.2.1.

5306.4 Transfilling. Transfilling areas and operations including, but not limited to, ventilation and separation, shall comply with NFPA 99.

5306.5 Medical gas systems and equipment. Medical gas systems and equipment shall be installed, tested and labeled in accordance with NFPA 99 and the general provisions of this chapter. Existing medical gas systems and equipment shall be used and maintained in accordance with the use, maintenance, inspection and testing provisions of NFPA 99 for medical gas systems and equipment.

5306.5.1 Medical gas cylinders. Operation and management of medical gas cylinders shall be in accordance with NFPA 99.

SECTION 5307—COMPRESSED GASES NOT OTHERWISE REGULATED

5307.1 General. Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 54, 55, and 60 through 67, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

5307.2 Ventilation. Indoor storage and use areas and storage buildings shall be provided with ventilation in accordance with Section 5004.3. Where mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

Exceptions:

1. A gas detection system complying with Section 5307.2.1 shall be permitted in lieu of mechanical ventilation.
2. Areas containing insulated liquid carbon dioxide systems used in beverage dispensing applications shall comply with Section 5307.3.

5307.2.1 Gas detection system. In rooms or areas not provided with ventilation in accordance with Section 5307.2, a gas detection system complying with Section 916 or, where approved, an oxygen depletion alarm system, either of which initiates audible and visible alarm signals in the room or area where sensors are installed, shall be provided.

5307.3 Insulated liquid carbon dioxide systems used in beverage dispensing applications. Insulated liquid carbon dioxide systems with more than 100 pounds (45.4 kg) of carbon dioxide used in beverage dispensing applications shall comply with Section 5307.3.1.

5307.3.1 Ventilation. Where insulated liquid carbon dioxide storage tanks, cylinders, piping and equipment are located indoors, rooms or areas containing storage tanks, cylinders, piping and equipment, and other areas where a leak of carbon dioxide is expected to accumulate, shall be provided with mechanical ventilation in accordance with Section 5004.3 and designed to maintain the room containing carbon dioxide at a negative pressure in relation to the surrounding area.

Exception: A gas detection system complying with Section 5307.3.2 shall be permitted in lieu of mechanical ventilation.

5307.3.2 Gas detection system. Where ventilation is not provided in accordance with Section 5307.3.1, a gas detection system complying with Section 916 shall be provided in rooms or indoor areas and in below-grade outdoor locations with insulated carbon dioxide systems. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or other approved locations. The system shall be designed as follows:

1. Activates an audible and visible supervisory alarm at a normally attended location upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m^3).
2. Activates an audible and visible alarm within the room or immediate area where the system is installed upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m^3).

5307.4 Carbon dioxide enrichment systems. The design, installation and maintenance of carbon dioxide enrichment systems with more than 100 pounds (45.4 kg) of carbon dioxide, and carbon dioxide enrichment systems with any quantity of carbon dioxide having a remote fill connection, shall comply with Sections 5307.4.1 through 5307.4.7.

5307.4.1 Documentation. The following information shall be provided with the application for permit:

1. Total aggregate quantity of liquid carbon dioxide in pounds or cubic feet at normal temperature and pressure.
2. Location and total volume of the room where the carbon dioxide enrichment operation will be conducted. Identify whether the room is at grade or below grade.
3. Location of containers relative to equipment, building openings and means of egress.
4. Manufacturer's specifications and pressure rating, including cut sheets, of all piping and tubing to be used.
5. A piping and instrumentation diagram that shows piping support and remote fill connections.
6. Details of container venting, including but not limited to vent line size, material and termination location.
7. Alarm and detection system and equipment, if applicable.
8. Seismic support for containers.

5307.4.2 Equipment. Pressure relief, vent piping, fill indicators, fill connections, vent terminations, piping systems and the storage, use and handling of the carbon dioxide shall be in accordance with Chapter 53 and NFPA 55.

5307.4.3 Gas detection system. A gas detection system complying with Section 916 shall be provided in rooms or indoor areas in which the carbon dioxide enrichment process is located, in rooms or indoor areas in which container systems are located, and in other areas where carbon dioxide is expected to accumulate. Carbon dioxide sensors shall be provided within 12 inches (305 mm) of the floor in the area where the gas is expected to accumulate or leaks are most likely to occur. The system shall be designed as follows:

1. Activates a low-level alarm upon detection of a carbon dioxide concentration of 5,000 ppm (9000 mg/m^3).
2. Activates a high-level alarm upon detection of a carbon dioxide concentration of 30,000 ppm (54 000 mg/m^3).

5307.4.3.1 System activation. Activation of the low-level gas detection system alarm shall automatically:

1. Stop the flow of carbon dioxide to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible supervisory alarm signal at an approved location within the building.

Activation of the high-level gas detection system alarm shall automatically:

1. Stop the flow of carbon dioxide to the piping system.
2. Activate the mechanical exhaust ventilation system.
3. Activate an audible and visible evacuation alarm both inside and outside of the carbon dioxide enrichment area, and the area in which the carbon dioxide containers are located.

5307.4.4 Pressurization and ventilation. Rooms or indoor areas in which carbon dioxide enrichment is provided shall be maintained at a negative pressure in relation to the surrounding areas in the building. A mechanical ventilation system shall be provided in accordance with the *California Mechanical Code* that complies with all of the following:

1. Mechanical ventilation in the room or area shall be at a rate of not less than 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$].
2. When activated by the gas detection system, the mechanical ventilation system shall remain on until manually reset.
3. The exhaust system intakes shall be taken from points within 12 inches (305 mm) of the floor.
4. The ventilation system shall discharge to the outdoors in an approved location.

5307.4.5 Signage. Hazard identification signs shall be posted at the entrance to the room and indoor areas where the carbon dioxide enrichment process is located, and at the entrance to the room or indoor area where the carbon dioxide containers are located. The sign shall be not less than 8 inches (200 mm) in width and 6 inches (150 mm) in height and indicate:

CAUTION—CARBON DIOXIDE GAS
VENTILATE THE AREA BEFORE ENTERING.
A HIGH CARBON DIOXIDE (CO_2)
GAS CONCENTRATION
IN THIS AREA
CAN CAUSE ASPHYXIATION.

5307.4.6 Seismic and structural design. Carbon dioxide system containers and piping shall comply with the seismic design requirements in Chapter 16 of the *California Building Code* and shall not exceed the floor loading limitation of the building.

5307.4.7 Container refilling. Carbon dioxide containers located indoors shall not be refilled unless filled from a remote connection located outdoors.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 54 – CORROSIVE MATERIALS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
5404.2.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

54 CORROSIVE MATERIALS

User notes:

About this chapter: Chapter 54 addresses the hazards of corrosive materials that have a destructive effect on living tissues. Though corrosive gases exist, most corrosive materials are solid or liquid and classified as either acids or bases (alkalis). These materials may pose a wide range of hazards other than corrosivity, such as combustibility, reactivity or oxidizing hazards, and must conform to the requirements of this code with respect to all of their known hazards. The focus of this chapter is on materials whose primary hazard is corrosivity; that is, the ability to destroy or irreparably damage living tissue on contact. As with other chapters of the this code, Section 5402 contains material that is defined in Chapter 2 and is applicable to the chapter contents.

SECTION 5401—GENERAL

5401.1 Scope. The storage and use of corrosive materials shall be in accordance with this chapter. Compressed gases shall also comply with Chapter 53.

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Stationary storage battery systems in accordance with Section 1207.
3. This chapter shall not apply to R-717 (ammonia) where used as a refrigerant in a refrigeration system (see Section 608).

5401.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 5402—DEFINITION

5402.1 Definition. The following term is defined in Chapter 2:

CORROSIVE.

SECTION 5403—GENERAL REQUIREMENTS

5403.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of corrosive materials in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5401.

5403.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of corrosive materials in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with this chapter and Chapter 50.

SECTION 5404—STORAGE

5404.1 Indoor storage. Indoor storage of corrosive materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(2), shall be in accordance with Sections 5001, 5003 and 5004 and this chapter.

5404.1.1 Liquid-tight floor. In addition to the provisions of Section 5004.12, floors in storage areas for corrosive liquids shall be of liquid-tight construction.

5404.2 Outdoor storage. Outdoor storage of corrosive materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(4) shall be in accordance with Sections 5001, 5003 and 5004 and this chapter.

5404.2.1 Above-ground outside storage tanks. *When required by Section 5004.2.2,* above-ground outside storage tanks exceeding an aggregate quantity of 1,000 gallons (3785 L) of corrosive liquids shall be provided with secondary containment in accordance with Section 5004.2.2.

5404.2.2 Distance from storage to exposures. Outdoor storage of corrosive materials shall not be within 20 feet (6096 mm) of buildings not associated with the manufacturing or distribution of such materials, lot lines, public streets, public alleys, public ways or means of egress. A 2-hour fire barrier without openings or penetrations, and extending not less than 30 inches (762 mm) above and to the sides of the storage area, is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

SECTION 5405—USE

5405.1 Indoor use. The indoor use of corrosive materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(2) shall be in accordance with Sections 5001, 5003 and 5005 and this chapter.

5405.1.1 Liquid transfer. Corrosive liquids shall be transferred in accordance with Section 5005.1.10.

5405.1.2 Ventilation. Where corrosive materials are dispensed or used, mechanical exhaust ventilation in accordance with Section 5005.2.1.1 shall be provided.

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5405.2 Outdoor use. The outdoor use of corrosive materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(4) shall be in accordance with Sections 5001, 5003 and 5005 and this chapter.

5405.2.1 Distance from use to exposures. Outdoor use of corrosive materials shall be located in accordance with Section 5404.2.2.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 55 – CRYOGENIC FLUIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

55 CRYOGENIC FLUIDS

User notes:

About this chapter: Chapter 55 regulates the hazards associated with the storage, use and handling of cryogenic fluids through regulation of such things as pressure relief mechanisms and proper container storage. These hazards are in addition to the code requirements that address the other hazards of cryogenic fluids such as flammability and toxicity. These other characteristics are dealt with in Chapter 50 and other chapters, such as Chapter 58 and its content about flammable gases. Cryogens are hazardous because they are held at extremely low temperatures and high pressures. Many cryogenic fluids, however, are actually inert gases and would not be regulated elsewhere in this code. Cryogens are used for many applications but specifically have had widespread use in the biomedical field and in space programs.

SECTION 5501—GENERAL

5501.1 Scope. Storage, use and handling of cryogenic fluids shall comply with this chapter and NFPA 55. Cryogenic fluids classified as hazardous materials shall also comply with the general requirements of Chapter 50. Partially full containers containing residual cryogenic fluids shall be considered as full for the purposes of the controls required.

Exceptions:

1. Fluids used as refrigerants in refrigeration systems (see Section 608).
2. Liquefied natural gas (LNG), which shall comply with NFPA 59A.

Oxidizing cryogenic fluids, including oxygen, shall comply with Chapter 63, as applicable.

Flammable cryogenic fluids, including hydrogen, methane and carbon monoxide, shall comply with Chapters 23 and 58, as applicable.

Inert cryogenic fluids, including argon, helium and nitrogen, shall comply with ANSI/CGA P-18.

5501.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 5502—DEFINITIONS

5502.1 Definitions. The following terms are defined in Chapter 2.

CRYOGENIC CONTAINER.

CRYOGENIC FLUID.

CRYOGENIC VESSEL.

FLAMMABLE CRYOGENIC FLUID.

LOW-PRESSURE TANK.

SECTION 5503—GENERAL REQUIREMENTS

5503.1 Containers. Containers employed for storage or use of cryogenic fluids shall comply with Sections 5503.1.1 through 5503.1.3.2 and Chapter 50.

5503.1.1 Nonstandard containers. Containers, equipment and devices that are not in compliance with recognized standards for design and construction shall be approved upon presentation of satisfactory evidence that they are designed and constructed for safe operation.

5503.1.1.1 Data submitted for approval. The following data shall be submitted to the fire code official with reference to the deviation from the recognized standard with the application for approval.

1. Type and use of container, equipment or device.
2. Material to be stored, used or transported.
3. Description showing dimensions and materials used in construction.
4. Design pressure, maximum operating pressure and test pressure.
5. Type, size and setting of pressure relief devices.
6. Other data requested by the fire code official.

5503.1.2 Concrete containers. Concrete containers shall be built in accordance with the *California Building Code*. Barrier materials and membranes used in connection with concrete, but not functioning structurally, shall be compatible with the materials contained.

5503.1.3 Foundations and supports. Containers shall be provided with substantial concrete or masonry foundations, or structural steel supports on firm concrete or masonry foundations. Containers shall be supported to prevent the concentration of excessive loads on the supporting portion of the shell. Foundations for horizontal containers shall be constructed to accommo-

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date expansion and contraction of the container. Foundations shall be provided to support the weight of vaporizers or heat exchangers.

5503.1.3.1 Temperature effects. Where container foundations or supports are subject to exposure to temperatures below -130°F (-90°C), the foundations or supports shall be constructed of materials to withstand the low-temperature effects of cryogenic fluid spillage.

5503.1.3.2 Corrosion protection. Portions of containers in contact with foundations or saddles shall be painted to protect against corrosion.

5503.2 Pressure relief devices. Pressure relief devices shall be provided in accordance with Sections 5503.2.1 through 5503.2.7 to protect containers and systems containing cryogenic fluids from rupture in the event of overpressure. Pressure relief devices shall be designed in accordance with CGA S-1.1, CGA S-1.2 and CGA S-1.3.

5503.2.1 Containers. Containers shall be provided with pressure relief devices.

5503.2.2 Vessels or equipment other than containers. Heat exchangers, vaporizers, insulation casings surrounding containers, vessels and coaxial piping systems in which liquefied cryogenic fluids could be trapped because of leakage from the primary container shall be provided with a pressure relief device.

5503.2.3 Sizing. Pressure relief devices shall be sized in accordance with the specifications to which the container was fabricated. The relief device shall have sufficient capacity to prevent the maximum design pressure of the container or system from being exceeded.

5503.2.4 Access. Pressure relief devices shall be located such that they are provided with ready access for inspection and repair.

5503.2.5 Arrangement. Pressure relief devices shall be arranged to discharge unobstructed to the open air in such a manner as to prevent impingement of escaping gas on personnel, containers, equipment and adjacent structures or to enter enclosed spaces.

Exception: DOTn-specified containers with an internal volume of 2 cubic feet (0.057 m^3) or less.

5503.2.6 Shutoffs between pressure relief devices and containers. Shutoff valves shall not be installed between pressure relief devices and containers.

Exceptions:

1. A shutoff valve is allowed on containers equipped with multiple pressure relief device installations where the arrangement of the valves provides the full required flow through the minimum number of required relief devices at all times.
2. A locking-type shutoff valve is allowed to be used upstream of the pressure relief device for service-related work performed by the supplier when in accordance with the requirements of the ASME *Boiler and Pressure Vessel Code*.

5503.2.7 Temperature limits. Pressure relief devices shall not be subjected to cryogenic fluid temperatures except when operating.

5503.3 Pressure relief vent piping. Pressure relief vent-piping systems shall be constructed and arranged so as to remain functional and direct the flow of gas to a safe location in accordance with Sections 5503.3.1 and 5503.3.2.

5503.3.1 Sizing. Pressure relief device vent piping shall have a cross-sectional area not less than that of the pressure relief device vent opening and shall be arranged so as not to restrict the flow of escaping gas.

5503.3.2 Arrangement. Pressure relief device vent piping and drains in vent lines shall be arranged so that escaping gas will discharge unobstructed to the open air and not impinge on personnel, containers, equipment and adjacent structures or enter enclosed spaces. Pressure relief device vent lines shall be installed in such a manner to exclude or remove moisture and condensation and prevent malfunction of the pressure relief device because of freezing or ice accumulation.

5503.4 Marking. Cryogenic containers and systems shall be marked in accordance with Sections 5503.4.1 through 5503.4.6.

5503.4.1 Identification signs. Visible hazard identification signs in accordance with NFPA 704 shall be provided at entrances to buildings or areas in which cryogenic fluids are stored, handled or used.

5503.4.2 Identification of contents. Stationary and portable containers shall be marked with the name of the gas contained. Stationary above-ground containers shall be placarded in accordance with Sections 5003.5 and 5003.6. Portable containers shall be identified in accordance with CGA C-7.

5503.4.3 Identification of containers. Stationary containers shall be identified with the manufacturing specification and maximum allowable working pressure with a permanent nameplate. The nameplate shall be installed on the container in a location provided with ready access. The nameplate shall be marked in accordance with the ASME *Boiler and Pressure Vessel Code* or DOTn 49 CFR Parts 100–185.

5503.4.4 Identification of container connections. Container inlet and outlet connections, liquid-level limit controls, valves and pressure gauges shall be identified with one of the following:

1. A permanent tag or label identifying the function.
2. A schematic drawing that portrays the function and designates whether the connection is to the vapor or liquid space of the container.

Where a schematic drawing is provided, it shall be attached to the container and maintained in a legible condition.

5503.4.5 Identification of piping systems. Piping systems shall be identified in accordance with ASME A13.1.

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5503.4.6 Identification of emergency shutoff valves. Emergency shutoff valves shall be identified and the location shall be clearly visible and indicated by means of a sign.

5503.5 Security. Cryogenic containers and systems shall be secured against accidental dislodgement and against access by unauthorized personnel in accordance with Sections 5503.5.1 through 5503.5.4.

5503.5.1 Security of areas. Containers and systems shall be secured against unauthorized entry and safeguarded in an approved manner.

5503.5.2 Securing of containers. Stationary containers shall be secured to foundations in accordance with the *California Building Code*. Portable containers subject to shifting or upset shall be secured. Nesting shall be an acceptable means of securing containers.

5503.5.3 Securing of vaporizers. Vaporizers, heat exchangers and similar equipment shall be anchored to a suitable foundation and its connecting piping shall be sufficiently flexible to provide for the effects of expansion and contraction due to temperature changes.

5503.5.4 Physical protection. Containers, piping, valves, pressure relief devices, regulating equipment and other appurtenances shall be protected against physical damage and tampering.

5503.6 Electrical wiring and equipment. Electrical wiring and equipment shall comply with *the California Electrical Code* and Sections 5503.6.1 and 5503.6.2.

5503.6.1 Location. Containers and systems shall not be located where they could become part of an electrical circuit.

5503.6.2 Electrical grounding and bonding. Containers and systems shall not be used for electrical grounding. Where electrical grounding and bonding is required, the system shall comply with *the California Electrical Code*. The grounding system shall be protected against corrosion, including corrosion caused by stray electric currents.

5503.7 Service and repair. Service, repair, modification or removal of valves, pressure relief devices or other container appurtenances shall comply with Sections 5503.7.1 and 5503.7.2 and the ASME *Boiler and Pressure Vessel Code*, Section VIII or DOTn 49 CFR Parts 100–185.

5503.7.1 Containers. Containers that have been removed from service shall be handled in an approved manner.

5503.7.2 Systems. Service and repair of systems shall be performed by trained personnel.

5503.8 Unauthorized use. Containers shall not be used for any purpose other than to serve as a vessel for containing the product that it is designed to contain.

5503.9 Leaks, damage and corrosion. Leaking, damaged or corroded containers shall be removed from service. Leaking, damaged or corroded systems shall be replaced, repaired or removed in accordance with Section 5503.7.

5503.10 Lighting. Where required, lighting, including emergency lighting, shall be provided for fire appliances and operating facilities such as walkways, control valves and gates ancillary to stationary containers.

SECTION 5504—STORAGE

5504.1 General. Storage of containers shall comply with this section.

5504.2 Indoor storage. Indoor storage of containers shall be in accordance with Sections 5504.2.1 through 5504.2.2.3.

5504.2.1 Stationary containers. Stationary containers shall be installed in accordance with the provisions applicable to the type of fluid stored and this section.

5504.2.1.1 Containers. Stationary containers shall comply with Section 5503.1.

5504.2.1.2 Construction of indoor areas. Cryogenic fluids in stationary containers stored indoors shall be located in buildings, rooms or areas constructed in accordance with the *California Building Code*.

5504.2.1.3 Ventilation. Storage areas for stationary containers shall be ventilated in accordance with the *California Mechanical Code*.

5504.2.2 Portable containers. Indoor storage of portable containers shall comply with the provisions applicable to the type of fluid stored and Sections 5504.2.2.1 through 5504.2.2.3.

5504.2.2.1 Containers. Portable containers shall comply with Section 5503.1.

5504.2.2.2 Construction of indoor areas. Cryogenic fluids in portable containers stored indoors shall be stored in buildings, rooms or areas constructed in accordance with the *California Building Code*.

5504.2.2.3 Ventilation. Storage areas shall be ventilated in accordance with the *California Mechanical Code*.

5504.3 Outdoor storage. Outdoor storage of containers shall be in accordance with Sections 5504.3.1 through 5504.3.1.2.3.

5504.3.1 Separation from hazardous conditions. Cryogenic containers and systems in outdoor storage shall be separated from materials and conditions that pose exposure hazards to or from each other in accordance with Sections 5504.3.1.1 through 5504.3.1.1.5.

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5504.3.1.1 Stationary containers. Stationary containers shall be separated from exposure hazards in accordance with the provisions applicable to the type of fluid contained and the minimum separation distances indicated in Table 5504.3.1.1.

TABLE 5504.3.1.1—SEPARATION OF STATIONARY CONTAINERS FROM EXPOSURE HAZARDS

EXPOSURE	MINIMUM DISTANCE (feet)
Air intakes	10
Building exits	10
Buildings, regardless of construction type	1
Combustible materials such as paper, leaves, weeds, dry grass or debris	15
Lot lines	5
Nonambulatory patient areas	50
Other hazardous materials	In accordance with Chapter 50
Places of public assembly	50
Wall openings	1

For SI: 1 foot = 304.8 mm.

5504.3.1.1.1 Point-of-fill connections. Remote transfer points and fill connection points shall not be positioned closer to exposures than the minimum distances required for stationary containers.

5504.3.1.1.2 Surfaces beneath containers. Containers shall be placed on surfaces that are compatible with the fluid in the container.

5504.3.1.1.3 Location. Containers of cryogenic fluids shall not be located within diked areas containing other hazardous materials.

5504.3.1.1.4 Areas subject to flooding. Stationary containers located in areas subject to flooding shall be securely anchored or elevated to prevent the containers from separating from foundations or supports.

5504.3.1.1.5 Drainage. The area surrounding stationary containers shall be provided with a means to prevent accidental discharge of fluids from endangering personnel, containers, equipment and adjacent structures or to enter enclosed spaces. The stationary container shall not be placed where spilled or discharged fluids will be retained around the container.

Exception: These provisions shall not apply where it is determined by the fire code official that the container does not constitute a hazard, after consideration of special features such as crushed rock utilized as a heat sink, topographical conditions, nature of occupancy, proximity to structures on the same or adjacent property, and the capacity and construction of containers and character of fluids to be stored.

5504.3.1.2 Outdoor storage of portable containers. Outdoor storage of portable containers shall comply with Section 5503 and Sections 5504.3.1.2.1 through 5504.3.1.2.3.

5504.3.1.2.1 Exposure hazard separation. Portable containers in outdoor storage shall be separated from exposure hazards in accordance with Table 5504.3.1.2.1.

TABLE 5504.3.1.2.1—SEPARATION OF PORTABLE CONTAINERS FROM EXPOSURE HAZARDS

EXPOSURE	MINIMUM DISTANCE (feet)
Air intakes	10
Building exits	10
Combustible materials such as paper, leaves, weeds, dry grass or debris	15
Lot lines	5
Other hazardous materials	In accordance with Chapter 50
Wall openings	1

For SI: 1 foot = 304.8 mm.

5504.3.1.2.2 Surfaces beneath containers. The surface of the area on which stationary containers are placed, including the surface of the area located below the point where connections are made for the purpose of filling such containers, shall be compatible with the fluid in the container.

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5504.3.1.2.3 Drainage. The area surrounding portable containers shall be provided with a means to prevent accidental discharge of fluids from endangering adjacent containers, buildings, equipment or adjoining property.

Exception: These provisions shall not apply where it is determined by the fire code official that the container does not constitute a hazard.

SECTION 5505—USE AND HANDLING

5505.1 General. Use and handling of cryogenic fluid containers and systems shall comply with Sections 5505.1.1 through 5505.5.2.

5505.1.1 Cryogenic fluid systems. Cryogenic fluid systems shall be suitable for the use intended and designed by persons competent in such design. Equipment, machinery and processes shall be listed or approved.

5505.1.2 Piping systems. Piping, tubing, valves and joints and fittings conveying cryogenic fluids shall be installed in accordance with the material-specific provisions of Section 5501.1 and Sections 5505.1.2.1 through 5505.1.2.6.

5505.1.2.1 Design and construction. Piping systems shall be suitable for the use intended through the full range of pressure and temperature to which they will be subjected. Piping systems shall be designed and constructed to provide adequate allowance for expansion, contraction, vibration, settlement and fire exposure.

5505.1.2.2 Joints. Joints on container piping and tubing shall be threaded, welded, silver brazed or flanged.

5505.1.2.3 Valves and accessory equipment. Valves and accessory equipment shall be suitable for the intended use at the temperatures of the application and shall be designed and constructed to withstand the maximum pressure at the minimum temperature to which they will be subjected.

5505.1.2.3.1 Shutoff valves on containers. Shutoff valves shall be provided on all container connections except for pressure relief devices. Shutoff valves shall be provided with access thereto and located as close as practical to the container.

5505.1.2.3.2 Shutoff valves on piping. Shutoff valves shall be installed in piping containing cryogenic fluids where needed to limit the volume of liquid discharged in the event of piping or equipment failure. Pressure relief valves shall be installed where liquid is capable of being trapped between shutoff valves in the piping system (see Section 5503.2).

5505.1.2.4 Physical protection and support. Piping systems shall be supported and protected from physical damage. Piping passing through walls shall be protected from mechanical damage.

5505.1.2.5 Corrosion protection. Above-ground piping that is subject to corrosion because of exposure to corrosive atmospheres, shall be constructed of materials to resist the corrosive environment or otherwise protected against corrosion. Below-ground piping shall be protected against corrosion.

5505.1.2.6 Testing. Piping systems shall be tested and proven free of leaks after installation as required by the standards to which they were designed and constructed. Test pressures shall be not less than 150 percent of the maximum allowable working pressure where hydraulic testing is conducted or 110 percent where testing is conducted pneumatically.

5505.2 Indoor use. Indoor use of cryogenic fluids shall comply with the material-specific provisions of Section 5501.1.

5505.3 Outdoor use. Outdoor use of cryogenic fluids shall comply with the material specific provisions of Sections 5501.1, 5505.3.1 and 5505.3.2.

5505.3.1 Separation. Distances from lot lines, buildings and exposure hazards shall comply with Section 5504.3 and the material-specific provisions of Section 5501.1.

5505.3.2 Emergency shutoff valves. Manual or automatic emergency shutoff valves shall be provided to shut off the cryogenic fluid supply in case of emergency. An emergency shutoff valve shall be located at the source of supply and at the point where the system enters the building.

5505.4 Filling and dispensing. Filling and dispensing of cryogenic fluids shall comply with Sections 5505.4.1 through 5505.4.3.

5505.4.1 Dispensing areas. Dispensing of cryogenic fluids with physical or health hazards shall be conducted in approved locations. Dispensing indoors shall be conducted in areas constructed in accordance with the *California Building Code*.

5505.4.1.1 Ventilation. Indoor areas where cryogenic fluids are dispensed shall be ventilated in accordance with the requirements of the *California Mechanical Code* in a manner that captures any vapor at the point of generation.

Exception: Cryogenic fluids that can be demonstrated not to create harmful vapors.

5505.4.1.2 Piping systems. Piping systems utilized for filling or dispensing of cryogenic fluids shall be designed and constructed in accordance with Section 5505.1.2.

5505.4.2 Vehicle loading and unloading areas. Loading or unloading areas shall be conducted in an approved manner in accordance with the standards referenced in Section 5501.1.

5505.4.3 Limit controls. Limit controls shall be provided to prevent overfilling of stationary containers during filling operations.

5505.5 Handling. Handling of cryogenic containers shall comply with Sections 5505.5.1 and 5505.5.2.

5505.5.1 Carts and trucks. Cryogenic containers shall be moved using an approved method. Where cryogenic containers are moved by hand cart, hand truck or other mobile device, such carts, trucks or devices shall be designed for the secure movement of the container.

Carts and trucks used to transport cryogenic containers shall be designed to provide a stable base for the commodities to be transported and shall have a means of restraining containers to prevent accidental dislodgement.

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5505.5.2 Closed containers. Pressurized containers shall be transported in a closed condition. Containers designed for use at atmospheric conditions shall be transported with appropriate loose-fitting covers in place to prevent spillage.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 56 – EXPLOSIVES AND FIREWORKS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
5601.1			X																				
5601.1.3			X																				
5601.1.4			X																				
5601.2.2			X																				
5601.2.3			X																				
5601.2.4			X																				
5601.3.1			X																				
5602.1			X																				
[T-19 §1559.3]				X																			
[T-19 §1559.9]				X																			
[T-19 §1559.16]				X																			
[T-19 §1559.18]				X																			
[T-19 §1559.20]				X																			
[T-19 §1559.21]				X																			
5603.2			X																				
Table 5604.3			X																				
Table 5604.5.2(1)			X																				
5604.7.5.4			X																				
5604.7.8			X																				
5604.7.10			X																				
5604.8.4			X																				
5604.10.3			X																				
5604.11			X																				
[T-19 §1571]				X																			
[T-19 §1571.1]				X																			
[T-19 §1571.2]				X																			
[T-19 §1571.3]				X																			
[T-19 §1571.4]				X																			
[T-19 §1571.5]				X																			
[T-19 §1571.6]				X																			
[T-19 §1571.7]				X																			
5606.7			X																				
[T-19 §1574.1]				X																			
[T-19 §1574.2]				X																			
[T-19 §1574.3]				X																			
[T-19 §1574.4]				X																			

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CHAPTER 56 – EXPLOSIVES AND FIREWORKS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
[T-19 §1574.5]				X																			
[T-19 §1575]				X																			
[T-19 §1575.1]				X																			
[T-19 §1575.2]				X																			
5607.1			X																				
5607.9.1			X																				
5607.9.2			X																				
5608.1			X																				
5608.1.1			X																				
[T-19 §980 - §1006]				X																			
5610			X																				
[T-19 §1010 - §1015]				X																			
5611			X																				
[T-19 §1020 - §1028]				X																			
5612			X																				
[T-19 §1030 - §1039]				X																			
5613			X																				
[T-19 §1045 - §1046]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

56

EXPLOSIVES AND FIREWORKS

User notes:

About this chapter: Chapter 56 prescribes minimum requirements for the safe manufacture, storage, handling and use of explosives, ammunition and blasting agents for commercial and industrial occupancies. These provisions are intended to protect the general public, emergency responders and individuals who handle explosives. It also regulates the manufacturing, retail sale, display and wholesale distribution of fireworks; establishes the requirements for obtaining approval to manufacture, store, sell, discharge or conduct a public display; and references national standards for regulations governing manufacture, storage and public displays.

SECTION 5601—GENERAL

5601.1 Scope. The provisions of this chapter shall govern the possession, manufacture, storage, handling, sale and use of explosives, explosive materials, fireworks *rockets, emergency signaling devices* and small arms ammunition.

Exceptions:

1. The Armed Forces of the United States, Coast Guard or National Guard.
2. Explosives in forms prescribed by the official United States Pharmacopoeia.
3. The possession, storage and use of small arms ammunition where packaged in accordance with DOTn packaging requirements.
4. The possession, storage and use of not more than 1 pound (0.454 kg) of commercially manufactured sporting black powder, 20 pounds (9 kg) of smokeless powder and 10,000 small arms primers for hand loading of small arms ammunition for personal consumption.
5. The use of explosive materials by federal, state and local regulatory, law enforcement and fire agencies acting in their official capacities.
6. Special industrial explosive devices that in the aggregate contain less than 50 pounds (23 kg) of explosive materials.
7. The possession, storage and use of blank industrial-power load cartridges where packaged in accordance with DOTn packaging regulations.
8. Transportation in accordance with DOTn 49 CFR Parts 100–185.
9. Items preempted by federal regulations.
10. *Items preempted by state law and/or regulations.*

For additional provisions regarding the possession, manufacture, storage, handling, sale and use of explosives, see California Code of Regulations, Title 19, Division 1, Chapter 10.

5601.1.1 Explosive material standard. In addition to the requirements of this chapter, NFPA 495 shall govern the manufacture, transportation, storage, sale, handling and use of explosive materials .

5601.1.2 Explosive material terminals. In addition to the requirements of this chapter, the operation of explosive material terminals shall conform to the provisions of NFPA 498.

5601.1.3 Fireworks. The possession, manufacture, storage, sale, handling and use of fireworks are prohibited.

Exceptions:

1. Storage and handling of fireworks as allowed in Section 5604.
2. Manufacture, assembly and testing of fireworks as allowed in Section 5605 *and Health and Safety Code Division 11.*
3. The use of fireworks for fireworks displays *pyrotechnics before a proximate audience and pyrotechnic special effects in motion pictures, television, theatrical or group entertainment productions* as allowed in *Title 19, Division 1, Chapter 6 Fireworks reprinted in* Section 5608 *and Health and Safety Code Division 11.*
4. The possession, storage, sale, handling and use of specific types of Division 1.4G fireworks where allowed by applicable laws, ordinances and regulations, provided that such fireworks and facilities comply with the 2006 edition of NFPA 1124, CPSC 16 CFR Parts 1500 and 1507, and DOTn 49 CFR Parts 100–185, as applicable for consumer fireworks *and Health and Safety Code Division 11.*

5601.1.4 Rocketry. *For rocketry requirements see California Code of Regulations, Title 19, Division 1, Chapter 6, reprinted in Sections 5610, 5611 and 5612.*

5601.1.5 Ammonium nitrate. The storage and handling of ammonium nitrate shall comply with the requirements of NFPA 400 and Chapter 63.

Exception: Storage of ammonium nitrate in magazines with blasting agents shall comply with the requirements of NFPA 495.

5601.2 Permit required. Permits shall be required as set forth in Section 105.5 and regulated in accordance with this section.

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5601.2.1 Residential uses. Persons shall not keep or store, nor shall any permit be issued to keep or store, any explosives at any place of habitation, or within 100 feet (30 480 mm) thereof.

Exception: Storage of smokeless propellant, black powder and small arms primers for personal use and not for resale in accordance with Section 5606.

5601.2.2 Sale and retail display. Persons shall not construct a retail display nor offer for sale explosives, explosive materials or fireworks on highways, sidewalks, public property or in Group A or E occupancies.

Exception: *Fireworks in accordance with California Code of Regulations, Title 19, Division 1, Chapter 6, see Section 5608.*

5601.2.3 Permit restrictions. The fire code official is authorized to limit the quantity of explosives, explosive materials or fireworks permitted at a given location. Persons possessing a permit for storage of explosives at any place, shall not keep or store an amount greater than authorized in such permit. Only the kind of explosive specified in such a permit shall be kept or stored.

Exception: *Fireworks in accordance with California Code of Regulations, Title 19, Division 1, Chapter 6, see Section 5608.*

5601.2.4 Financial responsibility. Before a permit is issued, as required by Section 5601.2, the applicant shall file with the jurisdiction a corporate surety bond in the principal sum of $100,000 or a public liability insurance policy for the same amount, for the purpose of the payment of all damages to persons or property that arise from, or are caused by, the conduct of any act authorized by the permit upon which any judicial judgment results. The fire code official is authorized to specify a greater or lesser amount when, in his or her opinion, conditions at the location of use indicate a greater or lesser amount is required. Government entities shall be exempt from this bond requirement.

Exception: *Fireworks in accordance with California Code of Regulations, Title 19, Division 1, Chapter 6, see Section 5608.*

5601.2.4.1 Blasting. Before approval to do blasting is issued, the applicant for approval shall file a bond or submit a certificate of insurance in such form, amount and coverage as determined by the legal department of the jurisdiction to be adequate in each case to indemnify the jurisdiction against any and all damages arising from permitted blasting.

5601.2.4.2 Fireworks display. The permit holder shall furnish a bond or certificate of insurance in an amount deemed adequate by the fire code official for the payment of all potential damages to a person or persons or to property by reason of the permitted display, and arising from any acts of the permit holder, the agent, employees or subcontractors.

5601.3 Prohibited explosives. Permits shall not be issued or renewed for possession, manufacture, storage, handling, sale or use of the following materials and such materials currently in storage or use shall be disposed of in an approved manner.

1. Liquid nitroglycerin.
2. Dynamite containing more than 60-percent liquid explosive ingredient.
3. Dynamite having an unsatisfactory absorbent or one that permits leakage of a liquid explosive ingredient under any conditions liable to exist during storage.
4. Nitrocellulose in a dry and uncompressed condition in a quantity greater than 10 pounds (4.54 kg) of net weight in one package.
5. Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.
6. Explosive compositions that ignite spontaneously or undergo marked decomposition, rendering the products of their use more hazardous, when subjected for 48 consecutive hours or less to a temperature of 167°F (75°C).
7. New explosive materials until approved by DOTn, except that permits are allowed to be issued to educational, governmental or industrial laboratories for instructional or research purposes.
8. Explosive materials forbidden for transport by DOTn.
9. Explosive materials containing an ammonium salt and a chlorate.
10. Explosives not packed or marked as required by DOTn 49 CFR Parts 100–185.

Exception: Gelatin dynamite.

5601.3.1 Abandonment prohibited. *No explosives shall be abandoned, but shall be returned to proper storage.*

5601.4 Qualifications. Persons in charge of magazines, blasting, fireworks display or pyrotechnic special effect operations shall not be under the influence of alcohol or drugs that impair sensory or motor skills, shall be not less than 21 years of age and shall demonstrate knowledge of all safety precautions related to the storage, handling or use of explosives, explosive materials or fireworks.

5601.5 Supervision. The fire code official is authorized to require operations permitted under the provisions of Section 5601.2 to be supervised at any time by the fire code official in order to determine compliance with all safety and fire regulations.

5601.6 Notification. Whenever a new explosive material storage or manufacturing site is established, including a temporary job site, the local law enforcement agency, fire department and local emergency planning committee shall be notified 48 hours in advance, not including Saturdays, Sundays and holidays, of the type, quantity and location of explosive materials at the site.

5601.7 Seizure. The fire code official is authorized to remove or cause to be removed or disposed of in an approved manner, at the expense of the owner, explosives, explosive materials or fireworks offered or exposed for sale, stored, possessed or used in violation of this chapter.

5601.8 Establishment of quantity of explosives and distances. The quantity of explosives and distances shall be in accordance with Sections 5601.8.1 through 5601.8.1.4.

5601.8.1 Quantity of explosives. The quantity-distance (Q-D) tables in Sections 5604.5 and 5605.3 shall be used to provide the minimum separation distances from potential explosion sites as set forth in Tables 5601.8.1(1) through 5601.8.1(3). The classification and the weight of the explosives are primary characteristics governing the use of these tables. The net explosive weight shall be determined in accordance with Sections 5601.8.1.1 through 5601.8.1.4.

TABLE 5601.8.1(1)—APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.1, 1.2 AND 1.5 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(1)	IBD in Table 5604.5.2(1)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(1)	ILD or IPD in Table 5605.3	IBD in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)
Operating building	ILD or IPD in Table 5604.5.2(1)	ILD or IPD in Table 5605.3	IBD in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)
Public traffic route	PTR in Table 5604.5.2(1)	PTR in Table 5604.5.2(1)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be 60 feet. Where a building or magazine containing explosives is barricaded, the minimum distance shall be 30 feet.

b. Linear interpolation between tabular values in the referenced Q-D tables shall not be allowed. Nonlinear interpolation of the values shall be allowed subject to an approved technical opinion and report prepared in accordance with Section 104.2.2.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

TABLE 5601.8.1(2)—APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.3 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(2)	ILD or IPD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)
Operating building	ILD or IPD in Table 5604.5.2(2)	ILD or IPD in Table 5604.5.2(2)	IBD in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)
Public traffic route	PTR in Table 5604.5.2(2)	PTR in Table 5604.5.2(2)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall be allowed.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

TABLE 5601.8.1(3)—APPLICATION OF QUANTITY-DISTANCE (Q-D) TABLES—DIVISION 1.4 EXPLOSIVES[a, b, c]

ITEM	MAGAZINE	OPERATING BUILDING	INHABITED BUILDING	PUBLIC TRAFFIC ROUTE
Inhabited building	IBD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	Not Applicable	Not Applicable
Magazine	IMD in Table 5604.5.2(3)	ILD or IPD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)
Operating building	ILD or IPD in Table 5604.5.2(3)	ILD or IPD in Table 5604.5.2(3)	IBD in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)
Public traffic route	PTR in Table 5604.5.2(3)	PTR in Table 5604.5.2(3)	Not Applicable	Not Applicable

For SI: 1 foot = 304.8 mm.

a. The minimum separation distance shall be not less than 50 feet.

b. Linear interpolation between tabular values in the referenced Q-D table shall not be allowed.

c. For definitions of quantity-distance abbreviations IBD, ILD, IMD, IPD and PTR, see Chapter 2.

5601.8.1.1 Mass-detonating explosives (Division 1.1, 1.2 or 1.5). The total net explosive weight of mass-detonating explosives (Division 1.1, 1.2 or 1.5) shall be used. See Table 5604.5.2(1) or Table 5605.3, as appropriate.

Exception: Where the TNT equivalence of the explosive material has been determined, the equivalence is allowed to be used to establish the net explosive weight.

5601.8.1.2 Nonmass-detonating explosives (excluding Division 1.4). Nonmass-detonating explosives (excluding Division 1.4) shall be as follows:

1. Division 1.3 propellants. The total weight of the propellants alone shall be the net explosive weight. The net weight of propellant shall be used. See Table 5604.5.2(2).
2. Combinations of bulk metal powder and pyrotechnic compositions. The sum of the net weights of metal powders and pyrotechnic compositions in the containers shall be the net explosive weight. See Table 5604.5.2(2).

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5601.8.1.3 Combinations of mass-detonating and nonmass-detonating explosives (excluding Division 1.4). Combination of mass-detonating and nonmass-detonating explosives (excluding Division 1.4) shall be as follows:

1. Where Division 1.1 and 1.2 explosives are located in the same site, determine the distance for the total quantity considered first as 1.1 and then as 1.2. The required distance is the greater of the two. Where the Division 1.1 requirements are controlling and the TNT equivalence of the 1.2 is known, the TNT equivalent weight of the 1.2 items shall be allowed to be added to the total explosive weight of Division 1.1 items to determine the net explosive weight for Division 1.1 distance determination. See Table 5604.5.2(2) or 5605.3, as appropriate.
2. Where Division 1.1 and 1.3 explosives are located in the same site, determine the distances for the total quantity considered first as 1.1 and then as 1.3. The required distance is the greater of the two. Where the Division 1.1 requirements are controlling and the TNT equivalence of the 1.3 is known, the TNT equivalent weight of the 1.3 items shall be allowed to be added to the total explosive weight of Division 1.1 items to determine the net explosive weight for Division 1.1 distance determination. See Table 5604.5.2(1), 5604.5.2(2) or 5605.3, as appropriate.
3. Where Division 1.1, 1.2 and 1.3 explosives are located in the same site, determine the distances for the total quantity considered first as 1.1, next as 1.2 and finally as 1.3. The required distance is the greatest of the three. As allowed by Items 1 and 2, TNT equivalent weights for 1.2 and 1.3 items are allowed to be used to determine the net weight of explosives for Division 1.1 distance determination. Table 5604.5.2(1) or 5605.3 shall be used where TNT equivalency is used to establish the net explosive weight.
4. For composite pyrotechnic items Division 1.1 and Division 1.3, the sum of the net weights of the pyrotechnic composition and the explosives involved shall be used. See Tables 5604.5.2(1) and 5604.5.2(2).

5601.8.1.4 Moderate fire—no blast hazards (Division 1.4). For Division 1.4 explosives, the total weight of the explosive material alone is the net weight. The net weight of the explosive material shall be used.

SECTION 5602—DEFINITIONS

5602.1 Definitions. The following terms are defined in Chapter 2:

AMMONIUM NITRATE.

BARRICADE.

Artificial barricade.

Natural barricade.

BARRICADED.

BLAST AREA.

BLAST SITE.

BLASTER.

BLASTING AGENT.

BULLET RESISTANT.

DETONATING CORD.

DETONATION.

DETONATOR.

DISCHARGE SITE.

➡ EXPLOSIVE.

High explosive.

Low explosive.

Mass-detonating explosives.

UN/DOTn Class 1 explosives.

Division 1.1.

Division 1.2.

Division 1.3.

Division 1.4.

Division 1.5.

Division 1.6.

EXPLOSIVE MATERIAL.

FALLOUT AREA.

FIREWORKS.

Fireworks, 1.3G.

Fireworks, 1.4G.

FIREWORKS DISPLAY.

HIGHWAY.

INHABITED BUILDING.

MAGAZINE.

Indoor.

Type 1.

Type 2.

Type 3.

Type 4.

Type 5.

MORTAR.

NET EXPLOSIVE WEIGHT (net weight).

OPERATING BUILDING.

OPERATING LINE.

PLOSOPHORIC MATERIAL.

PROXIMATE AUDIENCE.

PUBLIC TRAFFIC ROUTE (PTR).

PYROTECHNIC ARTICLE.

PYROTECHNIC COMPOSITION.

PYROTECHNIC SPECIAL EFFECT.

PYROTECHNIC SPECIAL-EFFECT MATERIAL.

PYROTECHNICS.

QUANTITY-DISTANCE (Q-D).

Inhabited building distance (IBD).

Intermagazine distance (IMD).

Intraline distance (ILD) or Intraplant distance (IPD).

RAILWAY.

READY BOX.

SMALL ARMS AMMUNITION.

SMALL ARMS PRIMERS.

SMOKELESS PROPELLANTS.

SPECIAL INDUSTRIAL EXPLOSIVE DEVICE.

THEFT RESISTANT.

[California Code of Regulations, Title 19, Division 1, §1559.3. Chief]

§1559.3. Chief *shall mean the issuing authority (as used in this chapter).*

[California Code of Regulations, Title 19, Division 1, §1559.9 Issuing authority]

§1559.9 Issuing authority *shall mean either the sheriff of a county, or the chief or other head of a municipal police department of any city or city and county, or the chief of a fire department or fire protection agency and their authorized representatives, provided that, in the event the designated issuing authority is the chief of a fire department or fire protection agency, such fire department or fire protection agency is organized with regularly paid, full-time personnel. The governing body of any county, city or city and county shall designate one of the above as the issuing authority within its jurisdiction and shall notify the State Fire Marshal of the person so designated.*

[California Code of Regulations, Title 19, Division 1, §1559.16 Public conveyance]

§1559.16 Public conveyance *shall mean any railway car, street car, ferry, cab, bus, airplane or other vehicle which is carrying passengers for hire.*

[California Code of Regulations, Title 19, Division 1, §1559.16 Person]

§1559.16 Person *shall mean any person, organization, firm, corporation, association, city, county, city and county and state, and shall include any of their employees and authorized representatives.*

[California Code of Regulations, Title 19, Division 1, §1559.16 Propellant-actuated power devices]

§1559.16 Propellant-actuated power devices *shall mean any tool or special mechanized device or gas generator system which is actuated by a propellant or which releases and directs work through a propellant charge.*

[California Code of Regulations, Title 19, Division 1, §1559.16 Propellants]

§1559.16 Propellants *shall mean solid propellants, commonly called smokeless powders, used in small arms ammunition, cannon, rockets, propellant-actuated power devices and similar devices.*

[California Code of Regulations, Title 19, Division 1, §1559.18 Railway]

§1559.18 Railway *shall mean any tramway, steam, electric, diesel electric or other railway or railroad which carries passengers for hire on the particular line or branch in the vicinity where explosives are stored or where explosives manufacturing buildings are situated.*

[California Code of Regulations, Title 19, Division 1, §1559.20 Tramway]

§1559.20 Tramway *shall mean an aerial passenger tramway used to transport passengers by the use of overhead steel cables or by ropes, supported in one (1) or more spans.*

[California Code of Regulations, Title 19, Division 1, §1559.21. US DOTn]

§1559.21. US DOTn *shall mean the United States Department of Transportation.*

SECTION 5603—RECORDKEEPING AND REPORTING

5603.1 General. Records of the receipt, handling, use or disposal of explosive materials, and reports of any accidents, thefts or unauthorized activities involving explosive materials shall conform to the requirements of this section.

5603.2 Transaction record. The permittee shall maintain a record of all transactions involving receipt, removal, *sale,* use or disposal of explosive materials. Such records shall be maintained for a period of 5 years.

Exception: Where only Division 1.4G (consumer fireworks) are handled, records need only be maintained for a period of 3 years.

5603.3 Loss, theft or unauthorized removal. The loss, theft or unauthorized removal of explosive materials from a magazine or permitted facility shall be reported to the fire code official, local law enforcement authorities and the US Department of Treasury, Bureau of Alcohol, Tobacco, Firearms and Explosives within 24 hours.

Exception: Loss of Division 1.4G (consumer fireworks) need not be reported to the Bureau of Alcohol, Tobacco, Firearms and Explosives.

5603.4 Accidents. Accidents involving the use of explosives, explosive materials and fireworks that result in injuries or property damage shall be reported to the fire code official immediately.

5603.5 Misfires. The pyrotechnic display operator or blaster in charge shall keep a record of all aerial shells that fail to fire or charges that fail to detonate.

5603.6 Hazard communication. Manufacturers of explosive materials and fireworks shall maintain records of chemicals, chemical compounds and mixtures required by DOL 29 CFR Part 1910.1200 and Section 407.

5603.7 Safety rules. Current safety rules covering the operation of magazines, as described in Section 5604.7, shall be posted on the interior of the magazine in a visible location.

SECTION 5604—EXPLOSIVE MATERIALS STORAGE AND HANDLING

5604.1 General. Storage of explosives and explosive materials, small arms ammunition, small arms primers, propellant-actuated cartridges and smokeless propellants in magazines shall comply with the provisions of this section.

5604.2 Magazine required. Explosives and explosive materials, and Division 1.3G fireworks shall be stored in magazines constructed, located, operated and maintained in accordance with the provisions of Section 5604 and NFPA 495 or NFPA 1124.

Exceptions:

1. Storage of fireworks at display sites in accordance with Section 5608.5 and NFPA 1123 or NFPA 1126.
2. Portable or mobile magazines not exceeding 120 square feet (11 m^2) in area shall not be required to comply with the requirements of the *California Building Code*.

5604.3 Magazines. The storage of explosives and explosive materials in magazines shall comply with Table 5604.3.

TABLE 5604.3—STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS, 1.3G MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA

NEW UN/DOTn DIVISION	OLD DOTn CLASS	ATF/OSHA CLASS	INDOOR[a] (pounds)				OUTDOOR (pounds)	MAGAZINE TYPE REQUIRED				
			Unprotected	Cabinet	Sprinklers	Sprinklers & cabinet		1	2	3	4	5
1.1[b]	A	High	0	0	1	2	1	X	X	X	—	—
1.2	A	High	0	0	1	2	1	X	X	X	—	—
1.2	B	Low	0	0	1	1	1	X	X	X	X	—
1.3	B	Low	0	0	*10*	*20*	1	X	X	X	X	—
1.4	B	Low	0	0	50	100	1	X	X	X	X	—

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TABLE 5604.3—STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS, 1.3G MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA—continued

NEW UN/DOTn DIVISION	OLD DOTn CLASS	ATF/OSHA CLASS	INDOOR[a] (pounds)				OUTDOOR (pounds)	MAGAZINE TYPE REQUIRED				
			Unprotected	Cabinet	Sprinklers	Sprinklers & cabinet		1	2	3	4	5
1.5	C	Low	0	0	1	2	1	X	X	X	X	—
1.5	Blasting Agent	Blasting Agent	0	0	1	2	1	X	X	X	X	X
1.6	Not Applicable	Not Applicable	0	0	1	2	1	X	X	X	X	X

For SI: 1 pound = 0.454 kg, 1 pound per gallon = 0.12 kg per liter, 1 ounce = 28.35 g.

a. A factor of 10 pounds per gallon shall be used for converting pounds (solid) to gallons (liquid) in accordance with Section 5003.1.2.

b. Black powder shall be stored in a Type 1, 2, 3 or 4 magazine as provided for in Section 5604.3.1.

5604.3.1 High explosives. Explosive materials classified as Division 1.1 or 1.2 or formerly classified as Class A by the US Department of Transportation shall be stored in Type 1, 2 or 3 magazines.

Exceptions:

1. Black powder shall be stored in a Type 1, 2, 3 or 4 magazine.
2. Cap-sensitive explosive material that is demonstrated not to be bullet sensitive shall be stored in a Type 1, 2, 3, 4 or 5 magazine.

5604.3.2 Low explosives. Explosive materials that are not cap sensitive shall be stored in a Type 1, 2, 3, 4 or 5 magazine.

5604.3.3 Detonating cord. For quantity and distance purposes, detonating cord of 50 grains per foot shall be calculated as equivalent to 8 pounds (4 kg) of high explosives per 1,000 feet (305 m). Heavier or lighter core loads shall be rated proportionally.

5604.4 Prohibited storage. Detonators shall be stored in a separate magazine for blasting supplies and shall not be stored in a magazine with other explosive materials.

5604.5 Location. The use of magazines for storage of explosives and explosive materials shall comply with Sections 5604.5.1 through 5604.5.3.3.

5604.5.1 Indoor magazines. The use of indoor magazines for storage of explosives and explosive materials shall comply with the requirements of Sections 5604.5.1.1 through 5604.5.1.7.

5604.5.1.1 Use. The use of indoor magazines for storage of explosives and explosive materials shall be limited to occupancies of Group F, H, M or S, and research and development laboratories.

5604.5.1.2 Construction. Indoor magazines shall comply with the following construction requirements:

1. Construction shall be fire resistant and theft resistant.
2. Exterior shall be painted red.
3. Base shall be fitted with wheels, casters or rollers to facilitate removal from the building in an emergency.
4. Lid or door shall be marked with conspicuous white lettering not less than 3 inches (76 mm) high and minimum $^1/_2$ inch (12.7 mm) stroke, reading "EXPLOSIVES—KEEP FIRE AWAY."
5. The least horizontal dimension shall not exceed the clear width of the entrance door.

5604.5.1.3 Quantity limit. Not more than 50 pounds (23 kg) of explosives or explosive materials shall be stored within an indoor magazine.

Exception: Day boxes used for the storage of in-process material in accordance with Section 5605.6.4.1.

5604.5.1.4 Prohibited use. Indoor magazines shall not be used within buildings containing Group R occupancies.

5604.5.1.5 Location. Indoor magazines shall be located within 10 feet (3048 mm) of an entrance and only on floors at or having ramp access to the exterior grade level.

5604.5.1.6 Number. Not more than two indoor magazines shall be located in the same building. Where two such magazines are located in the same building, one magazine shall be used solely for the storage of not more than 5,000 detonators.

5604.5.1.7 Separation distance. Where two magazines are located in the same building, they shall be separated by a distance of not less than 10 feet (3048 mm).

5604.5.2 Outdoor magazines. Outdoor magazines other than Type 3 shall be located so as to comply with Table 5604.5.2(2) or 5604.5.2(3) as set forth in Tables 5601.8.1(1) through 5601.8.1(3). Where a magazine or group of magazines, as described in Section 5604.5.2.2, contains different classes of explosive materials, and Division 1.1 materials are present, the required separations for the magazine or magazine group as a whole shall comply with Table 5604.5.2(2).

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TABLE 5604.5.2(1)—AMERICAN TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVES AS APPROVED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES AND REVISED JUNE 1991[a]

QUANTITY OF EXPLOSIVE MATERIALS[c]		DISTANCES IN FEET							
		Inhabited buildings		Public highways with traffic volume less than 3,000 vehicles per day		Public highways with traffic volume greater than 3,000 vehicles per day and passenger railways		Separation of magazines[d]	
Pounds over	Pounds not over	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
0	5	70	140	30	60	51	102	6	12
5	10	90	180	35	70	64	128	8	16
10	20	110	220	45	90	81	162	10	20
20	30	125	250	50	100	93	186	11	22
30	40	140	280	55	110	103	206	12	24
40	50	150	300	60	120	110	220	14	28
50	75	170	340	70	140	127	254	15	30
75	100	190	380	75	150	139	278	16	32
100	125	200	400	80	160	150	300	18	36
125	150	215	430	85	170	159	318	19	38
150	200	235	470	95	190	175	350	21	42
200	250	255	510	105	210	189	378	23	46
250	300	270	540	110	220	201	402	24	48
300	400	295	590	120	240	221	442	27	54
400	500	320	640	130	260	238	476	29	58
500	600	340	680	135	270	253	506	31	62
600	700	355	710	145	290	266	532	32	64
700	800	375	750	150	300	278	556	33	66
800	900	390	780	155	310	289	578	35	70
900	1,000	400	800	160	320	300	600	36	72
1,000	1,200	425	850	165	330	318	636	39	78
1,200	1,400	450	900	170	340	336	672	41	82
1,400	1,600	470	940	175	350	351	702	43	86
1,600	1,800	490	980	180	360	366	732	44	88
1,800	2,000	505	1,010	185	370	378	756	45	90
2,000	2,500	545	1,090	190	380	408	816	49	98
2,500	3,000	580	1,160	195	390	432	864	52	104
3,000	4,000	635	1,270	210	420	474	948	58	116
4,000	5,000	685	1,370	225	450	513	1,026	61	122
5,000	6,000	730	1,460	235	470	546	1,092	65	130
6,000	7,000	770	1,540	245	490	573	1,146	68	136
7,000	8,000	800	1,600	250	500	600	1,200	72	144
8,000	9,000	835	1,670	255	510	624	1,248	75	150
9,000	10,000	865	1,730	260	520	645	1,290	78	156
10,000	12,000	875	1,750	270	540	687	1,374	82	164
12,000	14,000	885	1,770	275	550	723	1,446	87	174
14,000	16,000	900	1,800	280	560	756	1,512	90	180
16,000	18,000	940	1,880	285	570	786	1,572	94	188
18,000	20,000	975	1,950	290	580	813	1,626	98	196
20,000	25,000	1,055	2,000	315	630	876	1,752	105	210
25,000	30,000	1,130	2,000	340	680	933	1,866	112	224
30,000	35,000	1,205	2,000	360	720	981	1,962	119	238
35,000	40,000	1,275	2,000	380	760	1,026	2,000	124	248

TABLE 5604.5.2(1)—AMERICAN TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVES AS APPROVED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES AND REVISED JUNE 1991[a]—continued

QUANTITY OF EXPLOSIVE MATERIALS[c]		DISTANCES IN FEET							
		Inhabited buildings		Public highways with traffic volume less than 3,000 vehicles per day		Public highways with traffic volume greater than 3,000 vehicles per day and passenger railways		Separation of magazines[d]	
Pounds over	Pounds not over	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
40,000	45,000	1,340	2,000	400	800	1,068	2,000	129	258
45,000	50,000	1,400	2,000	420	840	1,104	2,000	135	270
50,000	55,000	1,460	2,000	440	880	1,140	2,000	140	280
55,000	60,000	1,515	2,000	455	910	1,173	2,000	145	290
60,000	65,000	1,565	2,000	470	940	1,206	2,000	150	300
65,000	70,000	1,610	2,000	485	970	1,236	2,000	155	310
70,000	75,000	1,655	2,000	500	1,000	1,263	2,000	160	320
75,000	80,000	1,695	2,000	510	1,020	1,293	2,000	165	330
80,000	85,000	1,730	2,000	520	1,040	1,317	2,000	170	340
85,000	90,000	1,760	2,000	530	1,060	1,344	2,000	175	350
90,000	95,000	1,790	2,000	540	1,080	1,368	2,000	180	360
95,000	100,000	1,815	2,000	545	1,090	1,392	2,000	185	370
100,000	110,000	1,835	2,000	550	1,100	1,437	2,000	195	390
110,000	120,000	1,855	2,000	555	1,110	1,479	2,000	205	410
120,000	130,000	1,875	2,000	560	1,120	1,521	2,000	215	430
130,000	140,000	1,890	2,000	565	1,130	1,557	2,000	225	450
140,000	150,000	1,900	2,000	570	1,140	1,593	2,000	235	470
150,000	160,000	1,935	2,000	580	1,160	1,629	2,000	245	490
160,000	170,000	1,965	2,000	590	1,180	1,662	2,000	255	510
170,000	180,000	1,990	2,000	600	1,200	1,695	2,000	265	530
180,000	190,000	2,010	2,010	605	1,210	1,725	2,000	275	550
190,000	200,000	2,030	2,030	610	1,220	1,755	2,000	285	570
200,000	210,000	2,055	2,055	620	1,240	1,782	2,000	295	590
210,000	230,000	2,100	2,100	635	1,270	1,836	2,000	315	630
230,000	250,000	2,155	2,155	650	1,300	1,890	2,000	335	670
250,000	275,000	2,215	2,215	670	1,340	1,950	2,000	360	720
275,000	300,000[b]	2,275	2,275	690	1,380	2,000	2,000	385	770

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. This table applies only to the manufacture and permanent storage of commercial explosive materials. It is not applicable to transportation of explosives or any handling or temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles or other heavily encased explosives.

b. Storage in excess of 300,000 pounds of explosive materials in one magazine is not allowed.

c. Where a manufacturing building on an explosive materials plant site is designed to contain explosive materials, such building shall be located with respect to its proximity to inhabited buildings, public highways and passenger railways based on the maximum quantity of explosive materials permitted to be in the building at one time.

d. Where two or more storage magazines are located on the same property, each magazine shall comply with the minimum distances specified from inhabited buildings, railways and highways, and, in addition, they should be separated from each other by not less than the distances shown for separation of magazines, except that the quantity of explosives in detonator magazines shall govern in regard to the spacing of said detonator magazines from magazines containing other explosive materials. Where any two or more magazines are separated from each other by less than the specified separation of magazines distances, then two or more such magazines, as a group, shall be considered as one magazine, and the total quantity of explosive materials stored in such group shall be treated as if stored in a single magazine located on the site of any magazine in the group and shall comply with the minimum distances specified from other magazines, inhabited buildings, railways and highways.

All types of blasting caps in strengths through No. 8 cap shall be rated at $1^1/_2$ pounds of explosives per 1,000 caps. For strengths higher than No. 8 cap, consult the chief having jurisdiction. For quantity and distance purposes, detonating fuse up to 60 grains per foot, shall be calculated as equivalent to nine (9) pounds of high explosives per 1000 feet. Heavier cord loads shall be rated proportionally.

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TABLE 5604.5.2(2)—TABLE OF DISTANCES (Q-D) FOR BUILDINGS AND MAGAZINES CONTAINING EXPLOSIVES—DIVISION 1.3 MASS-FIRE HAZARD[a, b, c]

QUANTITY OF DIVISION 1.3 EXPLOSIVES (NET EXPLOSIVES WEIGHT)		DISTANCES IN FEET			
Pounds Over	Pounds Not Over	Inhabited Building Distance (IBD)	Distance to Public Traffic Route (PTR)	Intermagazine Distance (IMD)	Intraline Distance (ILD) or Intraplant Distance (IPD)
0	1,000	75	75	50	50
1,000	5,000	115	115	75	75
5,000	10,000	150	150	100	100
10,000	20,000	190	190	125	125
20,000	30,000	215	215	145	145
30,000	40,000	235	235	155	155
40,000	50,000	250	250	165	165
50,000	60,000	260	260	175	175
60,000	70,000	270	270	185	185
70,000	80,000	280	280	190	190
80,000	90,000	295	295	195	195
90,000	100,000	300	300	200	200
100,000	200,000	375	375	250	250
200,000	300,000	450	450	300	300

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Black powder, where stored in magazines, is defined as low explosive by the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF).

b. For quantities less than 1,000 pounds, the required distances are those specified for 1,000 pounds. The use of lesser distances is allowed where supported by approved test data or analysis.

c. Linear interpolation of explosive quantities between table entries is allowed.

TABLE 5604.5.2(3)—TABLE OF DISTANCES (Q-D) FOR BUILDINGS AND MAGAZINES CONTAINING EXPLOSIVES—DIVISION 1.4[c]

QUANTITY OF DIVISION 1.4 EXPLOSIVES (NET EXPLOSIVES WEIGHT)		DISTANCES IN FEET			
Pounds Over	Pounds Not Over	Inhabited Building Distance (IBD)	Distance to Public Traffic Route (PTR)	Intermagazine Distance[a, b] (IMD)	Intraline Distance (ILD) or Intraplant Distance[a] (IPD)
50	Not Limited	100	100	50	50

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. A separation distance of 100 feet is required for buildings of other than Type I or Type II construction as defined in the *California Building Code*.

b. For earth-covered magazines, specific separation is not required.

1. Earth cover material used for magazines shall be relatively cohesive. Solid or wet clay and similar types of soil are too cohesive and shall not be used. Soil shall be free from unsanitary organic matter, trash, debris and stones heavier than 10 pounds or larger than 6 inches in diameter. Compaction and surface preparation shall be provided, as necessary, to maintain structural integrity and avoid erosion. Where cohesive material cannot be used, as in sandy soil, the earth cover over magazines shall be finished with a suitable material to ensure structural integrity.
2. The earth fill or earth cover between earth-covered magazines shall be either solid or sloped, in accordance with the requirements of other construction features, but not less than 2 feet of earth cover shall be maintained over the top of each magazines. To reduce erosion and facilitate maintenance operations, the cover shall have a slope of 1 unit vertical to 2 units horizontal (50-percent slope).

c. Restricted to articles, including articles packaged for shipment, that are not regulated as an explosive under Bureau of Alcohol, Tobacco, Firearms and Explosives regulations, or unpacked articles used in process operations that do not propagate a detonation or deflagration between articles.

5604.5.2.1 Separation. Where two or more storage magazines are located on the same property, each magazine shall comply with the minimum distances specified from inhabited buildings, public transportation routes and operating buildings. Magazines shall be separated from each other by not less than the intermagazine distances (IMD) shown for the separation of magazines.

5604.5.2.2 Grouped magazines. Where two or more magazines are separated from each other by less than the intermagazine distances (IMD), such magazines as a group shall be considered as one magazine and the total quantity of explosive materials stored in the group shall be treated as if stored in a single magazine. The location of the group of magazines shall comply with the intermagazine distances (IMD) specified from other magazines or magazine groups, inhabited buildings (IBD), public transportation routes (PTR) and operating buildings (ILD or IPD) as required.

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5604.5.3 Special requirements for Type 3 magazines. Type 3 magazines shall comply with Sections 5604.5.3.1 through 5604.5.3.3.

5604.5.3.1 Location. Wherever practicable, Type 3 magazines shall be located away from neighboring inhabited buildings, railways, highways and other magazines in accordance with Table 5604.5.2(2) or 5604.5.2(3), as applicable.

5604.5.3.2 Supervision. Type 3 magazines shall be attended when explosive materials are stored within. Explosive materials shall be removed to appropriate storage magazines for unattended storage at the end of the workday.

5604.5.3.3 Use. Not more than two Type 3 magazines shall be located at the same blasting site. Where two Type 3 magazines are located at the same blasting site, one magazine shall be used solely for the storage of detonators.

5604.6 Construction. Magazines shall be constructed in accordance with Sections 5604.6.1 through 5604.6.5.2.

5604.6.1 Drainage. The ground around a magazine shall be graded so that water drains away from the magazine.

5604.6.2 Heating. Magazines requiring heat shall be heated as prescribed in NFPA 495 by either hot water radiant heating within the magazine or by indirect warm air heating.

5604.6.3 Lighting. Where lighting is necessary within a magazine, electric safety flashlights or electric safety lanterns shall be used, except as provided in NFPA 495.

5604.6.4 Nonsparking materials. In other than Type 5 magazines, there shall not be exposed ferrous metal on the interior of a magazine containing packages of explosives.

5604.6.5 Signs and placards. Property on which Type 1 magazines and outdoor magazines of Types 2, 4 and 5 are located shall be posted with signs stating: "NO SMOKING" and "EXPLOSIVES—KEEP OFF." These signs shall be of contrasting colors with a minimum letter height of 3 inches (76 mm) with a minimum brush stroke of $^1/_2$ inch (12.7 mm). The signs shall be located to minimize the possibility of a bullet shot at the sign hitting the magazine.

5604.6.5.1 Access road signs. At the entrance to explosive material manufacturing and storage sites, all access roads shall be posted with the following warning sign or other approved sign:

DANGER!
NEVER FIGHT EXPLOSIVE FIRES.
EXPLOSIVES ARE STORED ON THIS SITE
CALL _____

The sign shall be weather resistant with a reflective surface and have lettering not less than 2 inches (51 mm) high.

5604.6.5.2 Placards. Type 5 magazines containing Division 1.5 blasting agents shall be prominently placarded as required during transportation by DOTn 49 CFR Part 172 and DOTy 27 CFR Part 555.

5604.7 Operation. Magazines shall be operated in accordance with Sections 5604.7.1 through 5604.7.9.

5604.7.1 Security. Magazines shall be kept locked in the manner prescribed in NFPA 495 at all times except during placement or removal of *explosives* or inspection.

5604.7.2 Open flames and lights. Smoking, matches, flame-producing devices, open flames, firearms and firearms cartridges shall not be allowed inside of or within 50 feet (15 240 mm) of magazines.

5604.7.3 Brush. The area located around a magazine shall be kept clear of brush, dried grass, leaves, trash, debris and similar combustible materials for a distance of 25 feet (7620 mm).

5604.7.4 Combustible storage. Combustible materials shall not be stored within 50 feet (15 240 mm) of magazines.

5604.7.5 Unpacking and repacking explosive materials. Containers of explosive materials, except fiberboard containers, and packages of damaged or deteriorated explosive materials or fireworks shall not be unpacked or repacked inside or within 50 feet (15 240 mm) of a magazine or in close proximity to other explosive materials.

5604.7.5.1 Storage of opened packages. Packages of explosive materials that have been opened shall be closed before being placed in a magazine.

5604.7.5.2 Nonsparking tools. Tools used for the opening and closing of packages of explosive materials, other than metal slitters for opening paper, plastic or fiberboard containers, shall be made of nonsparking materials.

5604.7.5.3 Disposal of packaging. Empty containers and paper and fiber packaging materials that previously contained explosive materials shall be disposed of or reused in an approved manner.

5604.7.5.4 Packaging of Plosophoric Compounds. *No provisions of these regulations nor the standards referenced herein shall allow any person to repackage any compound from the original manufacturer's packaging unit. The manufacturer of plosophoric compounds shall package and ship only in units which have been determined to meet the standards for shipping of hazardous materials.*

5604.7.6 Tools and equipment. Metal tools, other than nonferrous transfer conveyors and ferrous metal conveyor stands protected by a coat of paint, shall not be stored in a magazine containing explosive materials or detonators.

5604.7.7 Contents. Magazines shall be used exclusively for the storage of explosive materials, blasting materials and blasting accessories.

5604.7.8 Methods of storage. *Packages of explosives shall be laid flat with top side up. Black powder, when stored in magazines with other explosives, shall be stored in separate piles. Corresponding grades and brands shall be stored together in such a manner*

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so that brands and grade marks are visible. All stocks shall be stored so as to be easily counted and checked. Packages of explosives shall be piled in a stable manner. When any kind of explosive is removed from a magazine for use, the oldest explosive of that particular kind shall always be taken first. The use of storage pallets is mandatory. Packages of explosive materials shall be stacked in a stable manner not exceeding 8 feet (2438 mm) in height.

5604.7.8 Compatibility. Corresponding grades and brands of explosive materials shall be stored together and in such a manner that the grade and brand marks are visible. Stocks shall be stored so as to be easily counted and checked. Packages of explosive materials shall be stacked in a stable manner not exceeding 8 feet (2438 mm) in height.

5604.7.9 Stock rotation. When explosive material is removed from a magazine for use, the oldest usable stocks shall be removed first.

5604.7.10 Flooding. *Magazine contents shall be protected from flooding.*

5604.8 Maintenance. Maintenance of magazines shall comply with Sections 5604.8.1 through 5604.8.3.

5604.8.1 Housekeeping. Magazine floors shall be regularly swept and be kept clean, dry and free of grit, paper, empty packages and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from magazine floors shall be disposed of in accordance with the manufacturer's approved instructions.

5604.8.2 Repairs. Explosive materials shall be removed from the magazine before making repairs to the interior of a magazine. Explosive materials shall be removed from the magazine before making repairs to the exterior of the magazine where there is a possibility of causing a fire. Explosive materials removed from a magazine under repair shall either be placed in another magazine or placed a safe distance from the magazine, where they shall be properly guarded and protected until repairs have been completed. Upon completion of repairs, the explosive materials shall be promptly returned to the magazine. Floors shall be cleaned before and after repairs.

5604.8.3 Floors. Magazine floors stained with liquid shall be dealt with in accordance with instructions obtained from the manufacturer of the explosive material stored in the magazine.

5604.8.4 Piling of stocks. *Provisions shall be made to prevent the piling of stocks of explosives directly against the walls of Class I magazines. Such protection, however, shall not in any way interfere with proper ventilation or the required ventilation openings.*

5604.9 Inspection. Magazines containing explosive materials shall be opened and inspected at maximum seven-day intervals. The inspection shall determine whether there has been an unauthorized or attempted entry into a magazine or an unauthorized removal of a magazine or its contents.

5604.10 Disposal of explosive materials. Explosive materials shall be disposed of in accordance with Sections 5604.10.1 through 5604.10.7.

5604.10.1 Notification. The fire code official shall be notified immediately where deteriorated or leaking explosive materials are determined to be dangerous or unstable and in need of disposal.

5604.10.2 Deteriorated materials. Where an explosive material has deteriorated to an extent that it is in an unstable or dangerous condition, or when a liquid has leaked from an explosive material, the person in possession of such material shall immediately contact the material's manufacturer to obtain disposal and handling instructions.

5604.10.3 Qualified person. The work of destroying explosive materials shall be directed by persons experienced in the destruction of explosive materials. *Only competent experienced persons, at least 21 years of age, shall do the work of destroying explosives.*

5604.10.4 Storage of misfires. Explosive materials and fireworks recovered from blasting or display misfires shall be placed in a magazine until an experienced person has determined the proper method for disposal.

5604.10.5 Disposal sites. Sites for the destruction of explosive materials and fireworks shall be approved and located at the maximum practicable safe distance from inhabited buildings, public highways, operating buildings and all other exposures to ensure keeping air blast and ground vibration to a minimum. The location of disposal sites shall not be closer to magazines, inhabited buildings, railways, highways and other rights-of-way than is allowed by Tables 5604.5.2(1), 5604.5.2(2) and 5604.5.2(3). Where possible, barricades shall be utilized between the destruction site and inhabited buildings. Areas where explosives are detonated or burned shall be posted with adequate warning signs.

5604.10.6 Reuse of site. Unless an approved burning site has been thoroughly saturated with water and has passed a safety inspection, 48 hours shall elapse between the completion of a burn and the placement of scrap explosive materials for a subsequent burn.

5604.10.7 Personnel safeguards. Once an explosive burn operation has been started, personnel shall relocate to a safe location where adequate protection from air blast and flying debris is provided. Personnel shall not return to the burn area until the person in charge has inspected the burn site and determined that it is safe for personnel to return.

5604.11 Explosives at Piers, Railway Stations and Cars or Vessels Not Otherwise Specified in These Rules and Regulations.

[California Code of Regulations, Title 19, Division 1, §1571. General]

§1571. General. *Except in an emergency and with permission of the "Chief" having jurisdiction, no person shall have or keep explosives in a railway car unless said car and contents and methods of loading are in accordance with the US DOTn Regulations for the Transportation of Explosives.*

[California Code of Regulations, Title 19, Division 1, §1571.1 Cargo Delivery].

§1571.1 Cargo Delivery. *No person shall deliver any explosive to any person who does not possess and present a valid permit, or copy thereof, to receive and transport from the "Chief" having jurisdiction and/or the California Highway Patrol. In addition to the permit requirements, rail or truck terminal personnel shall not deliver any explosive to any person unless such explosive conforms in all respects, including marking and packing, to the Regulations for the Transportation of Explosives.*

[California Code of Regulations, Title 19, Division 1, §1571.2 Placarding at Destination]

§1571.2 Placarding at Destination. *Every railway car containing explosives which has reached its destination, or is stopped in transit so as no longer to be in interstate commerce, shall remain placarded as required until completely unloaded. After unloading, such placards shall be removed.*

[California Code of Regulations, Title 19, Division 1, §1571.3 Explosives Location]

§1571.3 Explosives Location. *Any explosives at a railway facility, truck terminal, pier, wharf, harbor facility or airport terminal, within any city, city and county, county, fire protection district or the state, whether for delivery to a consignee, or forwarded to some other destination, shall be kept in a safe place which has been approved by the "Chief" having jurisdiction. In approving such location it is the intent that the explosives shall be isolated as far as practicable and in such manner that they can be easily and quickly removed.*

[California Code of Regulations, Title 19, Division 1, §1571.4 Cargo Delivery Times]

§1571.4 Cargo Delivery Times. *Explosives shall not be delivered to or received from any railway station, truck terminal, pier, wharf, harbor facility or airport terminal within a city, city and county, county, fire protection district, or the state between the hours of sunset and sunrise, except by special permit from the "Chief" having jurisdiction.*

[California Code of Regulations, Title 19, Division 1, §1571.5 Fire Department Notification]

§1571.5 Fire Department Notification. *When explosives are brought into any city, city and county, county, fire protection district or the state, by any means of transportation, for delivery to an intermediate receiver, consignee's agent or consignee, or to be forwarded to some other destination, the carrier performing the shipment shall immediately notify the consignee and when required, the "Chief" having jurisdiction of the arrival of the explosives, and if said consignee does not receive and remove the said explosives from the possession of the carrier within 48-hours (Sundays and holidays excluded), after such notification, then the railway, trucking firm, vessel agent or airline shall remove the said explosives from the city, city and county, county, fire protection district, or state or to a permitted magazine or make a report to the "Chief" having jurisdiction, who shall see that the said explosives are moved to a place of safety.*

[California Code of Regulations, Title 19, Division 1, §1571.6 Cargo Removal]

§1571.6 Cargo Removal. *Any person having been notified, as consignee, of a shipment of explosives being in the hands of any carrier, within any city, city and county, county, fire protection district, or the state, shall remove the said explosives within 48-hours (Sundays and holidays excluded), after receiving such notification to a place meeting the requirements of these rules and regulations.*

[California Code of Regulations, Title 19, Division 1, §1571.7 Facility Designation]

§1571.7 Facility Designation. *The "Chief" having jurisdiction has the authority to and may designate the location for, and limit the quantity of, explosives which may be loaded, unloaded or temporarily retained at any facility within his jurisdiction.*

SECTION 5605—MANUFACTURE, ASSEMBLY AND TESTING OF EXPLOSIVES, EXPLOSIVE MATERIALS AND FIREWORKS

5605.1 General. The manufacture, assembly and testing of explosives, ammunition, blasting agents and fireworks shall comply with the requirements of this section and NFPA 495 or NFPA 1124.

Exceptions:

1. The hand loading of small arms ammunition prepared for personal use and not offered for resale.
2. The mixing and loading of blasting agents at blasting sites in accordance with NFPA 495.
3. The use of binary explosives or plosophoric materials in blasting or pyrotechnic special effects applications in accordance with NFPA 495 or NFPA 1126.

5605.2 Emergency planning and preparedness. Emergency plans, emergency drills, employee training and hazard communication shall conform to the provisions of this section and Sections 404, 405, 406 and 407.

5605.2.1 Hazardous Materials Management Plans and Inventory Statements required. Detailed Hazardous Materials Management Plans (HMMP) and Hazardous Materials Inventory Statements (HMIS) complying with the requirements of Section 407 shall be prepared and submitted to the local emergency planning committee, the fire code official and the local fire department.

5605.2.2 Maintenance of plans. A copy of the required HMMP and HMIS shall be maintained on site and furnished to the fire code official on request.

5605.2.3 Employee training. Workers who handle explosives or explosive charges or dispose of explosives shall be trained in the hazards of the materials and processes in which they are to be engaged and with the safety rules governing such materials and processes.

5605.2.4 Emergency procedures. Approved emergency procedures shall be formulated for each plant and shall include personal instruction in any anticipated emergency. Personnel shall be made aware of an emergency warning signal.

5605.3 Intraplant separation of operating buildings. Explosives manufacturing buildings and fireworks manufacturing buildings, including those where explosive charges are assembled, manufactured, prepared or loaded utilizing Division 1.1, 1.2, 1.3, 1.4 or 1.5

explosives, shall be separated from all other buildings, including magazines, within the confines of the manufacturing plant, at a distance not less than those shown in Table 5604.5.2(3) or Table 5605.3, as appropriate.

The quantity of explosives in an operating building shall be the net weight of all explosives contained therein. Distances shall be based on the hazard division requiring the greatest separation, unless the aggregate explosive weight is divided by approved walls or shields designed for that purpose. Where dividing a quantity of explosives into smaller stacks, a suitable barrier or adequate separation distance shall be provided to prevent propagation from one stack to another.

Where distance is used as the sole means of separation within a building, such distance shall be established by testing. Testing shall demonstrate that propagation between stacks will not result. Barriers provided to protect against explosive effects shall be designed and installed in accordance with approved standards.

Exception: Fireworks manufacturing buildings separated in accordance with NFPA 1124.

TABLE 5605.3—MINIMUM INTRALINE (INTRAPLANT) SEPARATION DISTANCES (ILD OR IPD) BETWEEN BARRICADED OPERATING BUILDINGS CONTAINING EXPLOSIVES—DIVISION 1.1, 1.2 OR 1.5 MASS-EXPLOSION HAZARD[a]

NET EXPLOSIVE WEIGHT		
Pounds Over	**Pounds Not Over**	**Intraline Distance (ILD) or Intraplant Distance (IPD) (feet)**
0	50	30
50	100	40
100	200	50
200	300	60
300	400	65
400	500	70
500	600	75
600	700	80
700	800	85
800	900	90
900	1,000	95
1,000	1,500	105
1,500	2,000	115
2,000	3,000	130
3,000	4,000	140
4,000	5,000	150
5,000	6,000	160
6,000	7,000	170
7,000	8,000	180
8,000	9,000	190
9,000	10,000	200
10,000	15,000	225
15,000	20,000	245
20,000	25,000	265
25,000	30,000	280
30,000	35,000	295
35,000	40,000	310
40,000	45,000	320
45,000	50,000	330
50,000	55,000	340
55,000	60,000	350
60,000	65,000	360
65,000	70,000	370

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TABLE 5605.3—MINIMUM INTRALINE (INTRAPLANT) SEPARATION DISTANCES (ILD OR IPD) BETWEEN BARRICADED OPERATING BUILDINGS CONTAINING EXPLOSIVES—DIVISION 1.1, 1.2 OR 1.5 MASS-EXPLOSION HAZARD[a]—continued		
NET EXPLOSIVE WEIGHT		
Pounds Over	Pounds Not Over	Intraline Distance (ILD) or Intraplant Distance (IPD) (feet)
70,000	75,000	385
75,000	80,000	390
80,000	85,000	395
85,000	90,000	400
90,000	95,000	410
95,000	100,000	415
100,000	125,000	450
125,000	150,000	475
150,000	175,000	500
175,000	200,000	525
200,000	225,000	550
225,000	250,000	575
250,000	275,000	600
275,000	300,000	635

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

a. Where a building or magazine containing explosives is not barricaded, the intraline distances shown in this table shall be doubled.

5605.4 Separation of manufacturing operating buildings from inhabited buildings, public traffic routes and magazines. Where an operating building on an explosive materials plant site is designed to contain explosive materials, such a building shall be located away from inhabited buildings, public traffic routes and magazines in accordance with Table 5604.5.2(2) or 5604.5.2(3) as appropriate, based on the maximum quantity of explosive materials permitted to be in the building at one time (see Section 5601.8).

Exception: Fireworks manufacturing buildings constructed and operated in accordance with NFPA 1124.

5605.4.1 Determination of net explosive weight for operating buildings. In addition to the requirements of Section 5601.8 to determine the net explosive weight for materials stored or used in operating buildings, quantities of explosive materials stored in magazines located at distances less than intraline distances from the operating building shall be added to the contents of the operating building to determine the net explosive weight for the operating building.

5605.4.1.1 Indoor magazines. The storage of explosive materials located in indoor magazines in operating buildings shall be limited to a net explosive weight not to exceed 50 pounds (23 kg).

5605.4.1.2 Outdoor magazines with a net explosive weight less than 50 pounds. The storage of explosive materials in outdoor magazines located at less than intraline distances from operating buildings shall be limited to a net explosive weight not to exceed 50 pounds (23 kg).

5605.4.1.3 Outdoor magazines with a net explosive weight greater than 50 pounds. The storage of explosive materials in outdoor magazines in quantities exceeding 50 pounds (23 kg) net explosive weight shall be limited to storage in outdoor magazines located not less than intraline distances from the operating building in accordance with Section 5604.5.2.

5605.4.1.4 Net explosive weight of materials stored in combination indoor and outdoor magazines. The aggregate quantity of explosive materials stored in any combination of indoor magazines or outdoor magazines located at less than the intraline distances from an operating building shall not exceed 50 pounds (23 kg).

5605.5 Buildings and equipment. Buildings or rooms that exceed the maximum allowable quantity per control area of explosive materials shall be operated in accordance with this section and constructed in accordance with the requirements of the *California Building Code* for Group H occupancies.

Exception: Fireworks manufacturing buildings constructed and operated in accordance with NFPA 1124.

5605.5.1 Explosives dust. Explosives dust shall not be exhausted to the atmosphere.

5605.5.1.1 Wet collector. When collecting explosives dust, a wet collector system shall be used. Wetting agents shall be compatible with the explosives. Collector systems shall be interlocked with process power supplies so that the process cannot continue without the collector systems operating.

5605.5.1.2 Waste disposal and maintenance. Explosives dust shall be removed from the collection chamber as often as necessary to prevent overloading. The entire system shall be cleaned at a frequency that will eliminate hazardous concentrations of explosives dust in pipes, tubing and ducts.

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5605.5.2 Exhaust fans. Squirrel cage blowers shall not be used for exhausting hazardous fumes, vapors or gases. Only nonferrous fan blades shall be used for fans located within the ductwork and through which hazardous materials are exhausted. Motors shall be located outside the duct.

5605.5.3 Workstations. Workstations shall be separated by distance, barrier or other approved alternatives so that fire in one station will not ignite material in another workstation. Where necessary, the operator shall be protected by a personnel shield located between the operator and the explosive device or explosive material being processed. This shield and its support shall be capable of withstanding a blast from the maximum amount of explosives allowed behind it.

5605.6 Operations. Operations involving explosives shall comply with Sections 5605.6.1 through 5605.6.10.

5605.6.1 Isolation of operations. Where the type of material and processing warrants, mechanical operations involving explosives in excess of 1 pound (0.454 kg) shall be carried on at isolated stations or at intraplant distances, and machinery shall be controlled from remote locations behind barricades or at separations so that workers will be at a safe distance while machinery is operating.

5605.6.2 Static controls. The work area where the screening, grinding, blending and other processing of static-sensitive explosives or pyrotechnic materials is done shall be provided with approved static controls.

5605.6.3 Approved containers. Bulk explosives shall be kept in approved, nonsparking containers when not being used or processed. Explosives shall not be stored or transported in open containers.

5605.6.4 Quantity limits. The quantity of explosives at any particular workstation shall be limited to that posted on the load limit signs for the individual workstation. The total quantity of explosives for multiple workstations shall not exceed that established by the intraplant distances in Table 5604.5.2(3) or Table 5605.3, as appropriate.

5605.6.4.1 Magazines. Magazines used for storage in processing areas shall be in accordance with the requirements of Section 5604.5.1. Explosive materials shall be removed to appropriate storage magazines for unattended storage at the end of the workday. The contents of indoor magazines shall be added to the quantity of explosives contained at individual workstations and the total quantity of material stored, processed or used shall be utilized to establish the intraplant separation distances indicated by Table 5604.5.2(3) or Table 5605.3, as appropriate.

5605.6.5 Waste disposal. Approved receptacles with covers shall be provided for each location for disposing of waste material and debris. These waste receptacles shall be emptied and cleaned as often as necessary but not less than once each day or at the end of each shift.

5605.6.6 Safety rules. General safety rules and operating instructions governing the particular operation or process conducted at that location shall be available at each location.

5605.6.7 Personnel limits. The number of occupants in each process building and in each magazine shall not exceed the number necessary for proper conduct of production operations.

5605.6.8 Pyrotechnic and explosive composition quantity limits. Not more than 500 pounds (227 kg) of pyrotechnic or explosive composition, including not more than 10 pounds (5 kg) of salute powder shall be allowed at one time in any process building or area. Compositions not in current use shall be kept in covered nonferrous containers.

Exception: Composition that has been loaded or pressed into tubes or other containers as consumer fireworks.

5605.6.9 Posting limits. The maximum number of occupants and maximum weight of pyrotechnic and explosive composition permitted in each process building shall be posted in a conspicuous location in each process building or magazine.

5605.6.10 Heat sources. Fireworks, explosives or explosive charges in explosive materials manufacturing, assembly or testing shall not be stored near any source of heat.

Exception: Approved drying or curing operations.

5605.7 Maintenance. Maintenance and repair of explosives-manufacturing facilities and areas shall comply with Section 5604.8.

5605.8 Explosive materials testing sites. Detonation of explosive materials or ignition of fireworks for testing purposes shall be done only in isolated areas at sites where distance, protection from missiles, shrapnel or flyrock, and other safeguards provides protection against injury to personnel or damage to property.

5605.8.1 Protective clothing and equipment. Protective clothing and equipment shall be provided to protect persons engaged in the testing, ignition or detonation of explosive materials.

5605.8.2 Site security. Where tests are being conducted or explosives are being detonated, only authorized persons shall be present. Areas where explosives are regularly or frequently detonated or burned shall be approved and posted with adequate warning signs. Warning devices shall be activated before burning or detonating explosives to alert persons approaching from any direction that they are approaching a danger zone.

5605.9 Waste disposal. Disposal of explosive materials waste from manufacturing, assembly or testing operations shall be in accordance with Section 5604.10.

SECTION 5606—SMALL ARMS AMMUNITION AND SMALL ARMS AMMUNITION COMPONENTS

5606.1 General. Indoor storage and display of black powder, smokeless propellants, small arms primers,small arms ammunition and commercial reloading shall comply with this section and NFPA 495.

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5606.2 Prohibited storage. Small arms ammunition shall not be stored together with Division 1.1, Division 1.2 or Division 1.3 explosives unless the storage facility is suitable for the storage of explosive materials.

5606.3 Packages. Smokeless propellants shall be stored in approved shipping containers conforming to DOTn 49 CFR Part 173.

5606.3.1 Repackaging. The bulk repackaging of smokeless propellants, black powder and small arms primers shall not be performed in retail establishments.

5606.3.2 Damaged packages. Damaged containers shall not be repackaged.

Exception: Approved repackaging of damaged containers of smokeless propellant into containers of the same type and size as the original container.

5606.4 Storage in Group R occupancies. The storage of small arms ammunition components in Group R occupancies shall comply with Sections 5606.4.1 through 5606.4.3.

5606.4.1 Black powder. Black powder for personal use in quantities not exceeding 20 pounds (9 kg) shall be stored in original containers in occupancies limited to Group R-3. Quantities exceeding 20 pounds (9 kg) shall not be stored in any Group R occupancy.

5606.4.2 Smokeless propellants. Smokeless propellants for personal use in quantities not exceeding 20 pounds (9 kg) shall be stored in original containers in occupancies limited to Group R-3. Smokeless propellants in quantities exceeding 20 pounds (9 kg) but not exceeding 50 pounds (23 kg) and kept in a wooden box or cabinet having walls of not less than 1 inch (25 mm) nominal thickness shall be allowed to be stored in occupancies limited to Group R-3. Quantities exceeding these amounts shall not be stored in any Group R occupancy.

5606.4.3 Small arms primers. Not more than 10,000 small arms primers shall be stored in occupancies limited to Group R-3.

5606.5 Display and storage in Group M occupancies. The display and storage of small arms ammunition components in Group M occupancies shall comply with Sections 5606.5.1 through 5606.5.2.3.

5606.5.1 Display. Display of small arms ammunition components in Group M occupancies shall comply with Sections 5606.5.1.1 through 5606.5.1.3.

5606.5.1.1 Smokeless propellant. Not more than 20 pounds (9 kg) of smokeless propellants, in containers of 1 pound (0.454 kg) or less capacity each, shall be displayed in Group M occupancies.

5606.5.1.2 Black powder. Not more than 1 pound (0.454 kg) of black powder shall be displayed in Group M occupancies.

5606.5.1.3 Small arms primers. Not more than 10,000 small arms primers shall be displayed in Group M occupancies.

5606.5.2 Storage. Storage of small arms ammunition components shall comply with Sections 5606.5.2.1 through 5606.5.2.3.

5606.5.2.1 Smokeless propellant. Commercial stocks of smokeless propellants shall be stored as follows:

1. Quantities exceeding 20 pounds (9 kg), but not exceeding 100 pounds (45 kg) shall be stored in portable wooden boxes having walls of not less than 1 inch (25 mm) nominal thickness.
2. Quantities exceeding 100 pounds (45 kg), but not exceeding 800 pounds (363 kg), shall be stored in nonportable storage cabinets having walls not less than 1 inch (25 mm) nominal thickness. Not more than 400 pounds (182 kg) shall be stored in any one cabinet, and cabinets shall be separated by a distance of not less than 25 feet (7620 mm) or by a fire partition having a fire-resistance rating of not less than 1 hour.
3. Storage of quantities exceeding 800 pounds (363 kg), but not exceeding 5,000 pounds (2270 kg) in a building shall comply with all of the following:
    - 3.1. The warehouse or storage room is not open to unauthorized personnel.
    - 3.2. Smokeless propellant shall be stored in nonportable storage cabinets having wood walls not less than 1 inch (25 mm) nominal thickness and having shelves with not more than 3 feet (914 mm) of separation between shelves.
    - 3.3. Not more than 400 pounds (182 kg) is stored in any one cabinet.
    - 3.4. Cabinets shall be located against walls of the storage room or warehouse with not less than 40 feet (12 192 mm) between cabinets.
    - 3.5. The minimum required separation between cabinets shall be 20 feet (6096 mm) provided that barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades must extend not less than 10 feet (3048 mm) outward, be firmly attached to the wall and be constructed of steel not less than $^1/_4$ inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.
    - 3.6. Smokeless propellant shall be separated from materials classified as combustible liquids, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) or by a fire partition having a fire-resistance rating of 1 hour.
    - 3.7. The building shall be equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
4. Smokeless propellants not stored in accordance with Item 1, 2, or 3 shall be stored in a Type 2 or 4 magazine in accordance with Section 5604 and NFPA 495.

5606.5.2.2 Black powder. Commercial stocks of black powder in quantities less than 50 pounds (23 kg) shall be allowed to be stored in Type 2 or 4 indoor or outdoor magazines. Quantities greater than 50 pounds (23 kg) shall be stored in outdoor Type 2

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or 4 magazines. Where black powder and smokeless propellants are stored together in the same magazine, the total quantity shall not exceed that permitted for black powder.

5606.5.2.3 Small arms primers. Commercial stocks of small arms primers shall be stored as follows:

1. Quantities not to exceed 750,000 small arms primers stored in a building shall be arranged such that not more than 100,000 small arms primers are stored in any one pile and piles are not less than 15 feet (4572 mm) apart.
2. Quantities exceeding 750,000 small arms primers stored in a building shall comply with all of the following:
   - 2.1. The warehouse or storage building is not open to unauthorized personnel.
   - 2.2. Small arms primers shall be stored in cabinets. Not more than 200,000 small arms primers shall be stored in any one cabinet.
   - 2.3. Shelves in cabinets shall have vertical separation of not less than 2 feet (610 mm).
   - 2.4. Cabinets shall be located against walls of the warehouse or storage room with not less than 40 feet (12 192 mm) between cabinets. The minimum required separation between cabinets shall be allowed to be reduced to 20 feet (6096 mm) provided that barricades twice the height of the cabinets are attached to the wall, midway between each cabinet. The barricades shall be firmly attached to the wall and shall be constructed of steel not less than $^1/_4$ inch thick (6.4 mm), 2-inch (51 mm) nominal thickness wood, brick or concrete block.
   - 2.5. Small arms primers shall be separated from materials classified as combustible liquids, flammable liquids, flammable solids or oxidizing materials by a distance of 25 feet (7620 mm) or by a fire partition having a fire-resistance rating of 1 hour.
   - 2.6. The building shall be protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.
3. Small arms primers not stored in accordance with Item 1 or 2 of this section shall be stored in a magazine meeting the requirements of Section 5604 and NFPA 495.

5606.6 Commercial reloading. Commercial reloading of small arms ammunition shall comply with Sections 5606.6.1 through 5606.6.8.

5606.6.1 Electrical. Areas within 3 feet (914 mm) of reloading equipment shall be Class I, Division 2, Group A type.

5606.6.2 Exhaust fans. Squirrel cage blowers shall not be used for exhausting hazardous fumes, vapors or gases. Only nonferrous fan blades shall be used for fans located within the ductwork and through which hazardous materials are exhausted. Motors shall be located outside the duct.

5606.6.3 Workstations. Workstations shall be separated by distance, barrier or other approved alternatives so that fire in one station will not ignite material in another workstation.

5606.6.4 Personnel limits. The number of occupants in each process building and in each magazine shall not exceed the number necessary for proper conduct of production operations.

5606.6.5 Approved containers. Smokeless powder shall be kept in its original container.

5606.6.6 Static controls. The work area shall be provided with approved static controls.

5606.6.7 Waste disposal. Approved receptacles with covers shall be provided for each location for disposing of waste material and debris. These waste receptacles shall be emptied and cleaned as often as necessary but not less than once each day or at the end of each shift.

5606.6.8 Safety rules. General safety rules and operating instructions governing the particular operation or process conducted at that location shall be available at each location.

5606.7 Transportation of Small Arms Ammunition, Small Arms Primers, Smokeless Powder and Black Sporting Powder.

[California Code of Regulations, Title 19, Division 1, §1574.1. Transportation]

§1574.1. Transportation. *Quantities, in shipping containers approved by the US DOTn, of not more than twenty (20) pounds of smokeless powder or not more than five (5) pounds of black sporting powder (or any combination thereof) may be transported in a private passenger vehicle without a permit.*

[California Code of Regulations, Title 19, Division 1, §1574.2. Magazine]

§1574.2. Magazine—*When Required. Quantities in excess of twenty (20) pounds (but not exceeding fifty (50) pounds) of smokeless powder, or not more than five (5) pounds of black sporting powder (or any combination thereof) may be transported in a private passenger vehicle when approved by the "Chief" having jurisdiction, provided however, that such powder shall be transported in separate portable magazines having wooden walls of at least one (1) inch nominal thickness.*

[California Code of Regulations, Title 19, Division 1, §1574.3. Transportation Prohibitions]

§1574.3. Transportation Prohibitions. *Transportation of quantities in excess of fifty (50) pounds of smokeless powder or five (5) pounds of black sporting powder is prohibited in a private passenger vehicle.*

[California Code of Regulations, Title 19, Division 1, §1574.4. Transportation—US Department of Transportation]

§1574.4. Transportation—US Department of Transportation. *Transportation of quantities in excess of fifty (50) pounds of smokeless powder or five (5) pounds of black sporting powder in other than a private passenger vehicle shall be in accordance with the US DOTn regulations.*

[California Code of Regulations, Title 19, Division 1, §1574.5. Storage Containers]

§1574.5. Storage Containers. *All smokeless powder and black sporting powder shall be stored in US DOTn approved shipping containers, or in a container approved by the "Chief" having jurisdiction.*

[California Code of Regulations, Title 19, Division 1, §1575. Primer Containers]

§1575. Primer Containers. *Small arms ammunition primers shall not be transported or stored except in the original shipping container approved by the US DOTn.*

[California Code of Regulations, Title 19, Division 1, §1575.1. Transportation]

§1575.1. Transportation. *Truck or rail transportation of small arms ammunition primers shall be in accordance with US DOTn regulations.*

[California Code of Regulations, Title 19, Division 1, §1575.2 Transportation Prohibitions]

§1575.2 Transportation Prohibitions. *Not more than 250,000 small arms ammunition primers shall be transported in a private passenger vehicle.*

SECTION 5607—BLASTING

5607.1 General. Blasting operations shall be conducted only by approved, competent operators familiar with the required safety precautions and the hazards involved and in accordance with *this section and* the provisions of NFPA 495.

5607.2 Manufacturer's instructions. Blasting operations shall be performed in accordance with the instructions of the manufacturer of the explosive materials being used.

5607.3 Blasting in congested areas. Where blasting is done in a congested area or in close proximity to a structure, railway or highway, or any other installation, precautions shall be taken to minimize earth vibrations and air blast effects. Blasting mats or other protective means shall be used to prevent fragments from being thrown.

5607.4 Restricted hours. Surface-blasting operations shall only be conducted during daylight hours between sunrise and sunset. Other blasting shall be performed during daylight hours unless otherwise approved by the fire code official.

5607.5 Utility notification. Where blasting is being conducted in the vicinity of utility lines or rights-of-way, the blaster shall notify the appropriate representatives of the utilities not less than 24 hours in advance of blasting, specifying the location and intended time of such blasting. Verbal notices shall be confirmed with written notice.

Exception: In an emergency situation, the time limit shall not apply where approved.

5607.6 Electric detonator precautions. Precautions shall be taken to prevent accidental discharge of electric detonators from currents induced by radar and radio transmitters, lightning, adjacent power lines, dust and snowstorms, or other sources of extraneous electricity.

5607.7 Nonelectric detonator precautions. Precautions shall be taken to prevent accidental initiation of nonelectric detonators from stray currents induced by lightning or static electricity.

5607.8 Blasting area security. During the time that holes are being loaded or are loaded with explosive materials, blasting agents or detonators, only authorized persons engaged in drilling and loading operations or otherwise authorized to enter the site shall be allowed at the blast site. The blast site shall be guarded or barricaded and posted. Blast site security shall be maintained until after the post-blast inspection has been completed.

5607.9 Drill holes. Holes drilled for the loading of explosive charges shall be made and loaded in accordance with NFPA 495.

5607.9.1 Drill hole loading. *No holes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives shall be immediately returned to proper storage.*

5607.9.2 Drill hole deepening. *Drill holes which have contained explosives shall not be re-drilled.*

5607.10 Removal of excess explosive materials. After loading for a blast is completed and before firing, excess explosive materials shall be removed from the area and returned to the proper storage facilities.

5607.11 Initiation means. The initiation of blasts shall be by means conforming to the provisions of NFPA 495.

5607.12 Connections. The blaster shall supervise the connecting of the blastholes and the connection of the loadline to the power source or initiation point. Connections shall be made progressively from the blasthole back to the initiation point.

Blasting lead lines shall remain shunted (shorted) and shall not be connected to the blasting machine or other source of current until the blast is to be fired.

5607.13 Firing control. A blast shall not be fired until the blaster has made certain that all surplus explosive materials are in a safe place in accordance with Section 5607.10, all persons and equipment are at a safe distance or under sufficient cover and that an adequate warning signal has been given.

5607.14 Post-blast procedures. After the blast, the following procedures shall be observed.

1. Persons shall not return to the blast area until allowed to do so by the blaster in charge.
2. The blaster shall allow sufficient time for smoke and fumes to dissipate and for dust to settle before returning to or approaching the blast area.
3. The blaster shall inspect the entire blast site for misfires before allowing other personnel to return to the blast area.

5607.15 Misfires. Where a misfire is suspected, all initiating circuits shall be traced and a search made for unexploded charges. Where a misfire is found, the blaster shall provide proper safeguards for excluding all personnel from the blast area. Misfires shall be reported to the blasting supervisor immediately. Misfires shall be handled under the direction of the person in charge of the blasting operation in accordance with NFPA 495.

SECTION 5608—FIREWORKS DISPLAY

5608.1 General. Outdoor fireworks displays, use of pyrotechnics before a proximate audience and pyrotechnic special effects in motion picture, television, theatrical and group entertainment productions shall comply with *California Code of Regulations, Title 19, Division 1, Chapter 6 Fireworks and this section.*

5608.1.1 Scope. *Fireworks and temporary storage, use and handling of pyrotechnic special effects material used in motion pictures, television and theatrical and group entertainment productions shall be in accordance with California Code of Regulations, Title 19, Division 1, Chapter 6 Fireworks.*

[California Code of Regulations, Title 19, Division 1, §980-1006]

Article 2. Definitions

§980. Definitions.

Aerial Shell. *A cylinder or spherical cartridge containing a burst charge and pyrotechnic or non-pyrotechnic effects, a fuse, a black powder lift charge and is fired from a mortar.*

ASTM. *The American Society of Testing and Materials, a national organization publishing standards for all types of materials and products.*

Barrage. *A rapidly fired sequence of effects.*

Batten. *A strip of wood to which pyrotechnic devices are attached for support.*

Binary Low Explosive Compounds. *Special effects materials in which fuel and an oxidizer are mixed together to produce a pyrotechnic composition.*

Blank Cartridge. *A cartridge constructed from either metal or plastic casing, with a center or rim fire primer filled with various amounts of pyrotechnic compositions measured by loads.*

Blasting Galvanometer. *An electrical resistance measuring device designed specifically and approved for testing of electric firing circuits.*

Bottle Rocket. *A pyrotechnic device containing a maximum of 20 grams of pyrotechnic composition, which rises into the air upon ignition. A stick is used for guidance and stability, and a burst of color or noise, or both, is produced at height of flight.*

Break. *An individual burst from an aerial shell, producing either a visible or audible effect or both, and may consist of a single burst or multiple effects.*

Bullet Effect. *The discharge of the pyrotechnic or explosive bullet hit.*

Bullet Hit. *A device containing various levels and amounts of pyrotechnic composition, whose purpose is to create the illusion of a bullet impact.*

California Candle. *Hand held heavy paper or cardboard tube emitting showers of sparks.*

Comet. *A pyrotechnic device launched from a mortar that produces an ascending burning effect, is self-consuming, and may or may not contain a burst charge or stars.*

Darts. *To move suddenly and swiftly from one place to another.*

Detonator. *Any device containing a detonating charge that is used for initiating detonation in an explosive. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, detonating cord delay connectors, and nonelectric instantaneous and delay blasting caps.*

DOTn *means US Department of Transportation.*

Dud. *A pyrotechnic item which leaves the mortar and returns to earth without producing the intended burst or effect. See also Misfire.*

Electric Firing. *A technique used to discharge fireworks in which an electric match or squib and a source of electric current are used to ignite fuses or lift charges.*

Electric Match. *An electric device containing a pyrotechnic compound which ignites when sufficient current flows through the leads.*

Firecracker. *A device containing explosive pyrotechnic composition in an amount not to exceed 50 milligrams (.772 grains) in total pyrotechnic weight, in a fused container whose primary function is to produce an audible effect. Note: All firecrackers are classified as "dangerous fireworks", and pyrotechnic devices similar in construction to a "firecracker" which exceed the specified weight shall be designated explosives in accordance with Health and Safety Code Section 12000.*

Flash Paper. *Treated paper which is extremely sensitive to heat and creates a brief flash of fire upon ignition.*

Flash Powder. *Pyrotechnic composition intended for use in firecrackers and salutes, and often used for "flash"-type effects on stage and in productions involving special effects. Flash powder produces an audible report and a flash of light when ignited. Typical flash powder compositions contain potassium chlorate or potassium perchlorate, sulfur or antimony sulfide and powdered aluminum.*

Flower Pot. *A shell (not the lifting charge) that explodes at or near the bottom of a mortar blowing a shower of stars and burning material into the air.*

Fountain. *See Gerb.*

Gerb. *(also known as a Fountain). A device that, when ignited, emits a shower of sparks into the air at various altitudes.*

Ground Spinning Device. *Also known as a Ground Spinner. A pyrotechnic device that discharges sparks as it spins across the surface upon which it is placed.*

HDPE Mortar. *Also known as a High Density Polyethylene Mortar, is a mortar constructed of high density polyethylene which is certified and labeled as meeting one or more of the following ASTM standards, which are hereby incorporated by reference: ASTM D3350 or ASTM F714.*

Ignitor. *An electric, chemical or mechanical device used to initiate burning or pyrotechnic or propellant materials.*

Lance. *A thin cardboard tube packed with a color-producing pyrotechnic composition.*

License. *"License" means any nontransferable authorization granted by the State Fire Marshal to engage in any activity regulated by this part.*

Licensee. *"Licensee" means any person 21 years of age or older holding a fireworks license issued pursuant to Chapter 5 (commencing with Section 12570), of the Health and Safety Code.*

Loader. *A person who places shells into mortars.*

Low Burst or Low Break. *The result of a shell exploding below its prescribed height.*

Magazine Tender. *Person who distributes pyrotechnic items to the loader during the show.*

Match. *A fuse made of string or thread impregnated with black powder.*

Meteoric Shower. *A self-contained cardboard tube mounted on a plastic base emitting a shower of stars into the air.*

Mines or Mine Bags. *A device contained within a reusable or disposable tube, where upon ignition stars, firecrackers, salutes, whistles or other devices are propelled into the air, with the tube remaining on the ground.*

Misfire. *A pyrotechnic item which fails to function as designed after initiation. See also Dud.*

Monitor. *Person responsible for watching for pyrotechnic items which do not perform properly.*

Mortar. *A cylinder that is used to hold and fire public display or special effects pyrotechnic items or compositions as defined in Section 999 of this subchapter.*

Mortar Box. *Also known as a Trough. A portable wooden structure used for the placement of mortars.*

Mortar Rack. *A wooden rack holding closely spaced HDPE or paper mortars. Mortar racks are limited to 10 tubes per individual rack.*

Multiple Break Shell. *Aerial shell which has two or more breaks.*

Muzzle Burst. *The process of an aerial shell breaking or bursting just as it leaves the mortar, scattering stars and burning material.*

N.F.P.A. *The National Fire Protection Association.*

Non-metallic Mortar. *See HDPE and Paper Mortar definition.*

Pan Type Mortar. *A shallow metal container that is used to hold and fire special effect pyrotechnic compositions.*

Paper Mortar. *A mortar constructed of spiral or convolute wound paper or chipboard.*

Party Popper. *"Party Popper" also known by other names such as Champagne Party Poppers, Party Surprise Popper and Hot Shot Poppers, is a pyrotechnic device which contains less than 0.25 grain of pyrotechnic composition per unit load, designed to be held in the hand and when fired propels soft paper, cloth inserts or other similar fill material into the air.*

Pigeons. *Also known as line rockets. Pyrotechnic items using mechanical devices to control the effect of flight movement.*

Public Display of Fireworks. *"Public display of fireworks" means an entertainment feature where the public or a private group is admitted or permitted to view the display or discharge of dangerous fireworks, as defined in Section 12505 of Health and Safety Code.*

Report. *A detailed written account of all events involving pyrotechnic materials, devices and operations in which a fire, injury or death occurs, or in which any violation of the laws or regulations takes place.*

Retailer. *Any person who, at a fixed place of business, sells, transfers or gives fireworks to a consumer or user.*

Roman Candle. *A heavy paper or cardboard tube containing pellets of pyrotechnic composition which, when ignited, are expelled into the air at several-second intervals.*

Salute. *An aerial shell as well as other pyrotechnic items whose primary effects are detonation and flash of light.*

Set Piece. *Also known as ground display piece, mechanical piece. A pyrotechnic device or series of devices that while on the ground or elevated produces a visual and/or audible effect. These devices may employ fountains, roman candles, wheels and lances.*

Shunt. *A deliberate short-circuit of an electrically fired pyrotechnic device or a means contained within its firing system to protect it from accidental ignition by extraneous electricity.*

Single Break Shell. *Aerial shell having one or more effects within a cylindrical or spherical casing.*

Snap Cap. *Also known by other names such as, but not limited to, Snappers, Pop Pop Snappers, Fun Snaps and Bang Snaps. It is a pyrotechnic device that typically contains less than .20 grams, but shall not contain more than .25 grams, of gravel impregnated with not more than one milligram of pyrotechnic composition. Each unit consists of a small, roughly spherical paper parcel, approximately one-*

quarter ($^1/_4$) inch in diameter with a twisted paper tail. Each unit, when dropped against a hard surface, produces a small, toy cap-like report.

***Note:** Studies are conducted annually by the Office of State Fire Marshal which will determine whether or not there are adverse consequences from the regulation of snap caps.*

***Soft Detonator.** A detonator in which the explosive or pyrotechnic material is encased in a non-metallic container.*

***Sparkler.** A Stick or wire coated with a pyrotechnic composition that produces a shower of sparks upon ignition.*

***Squib.** See Electric Match. See also Detonator and Soft Detonator.*

***Travel.** To move from point of ignition either vertically or horizontally.*

***Trough.** Also known as a Mortar Box. A portable wooden structure used for the placement of mortars.*

***Wheel Driver.** A heavy paper or cardboard tube emitting a shower of sparks from a very small orifice, similar to a propellant motor.*

***Within This State.** "Within this state" means all territory within the boundaries of this state.*

Article 3. Licenses

§981. General.

(a) No person shall engage in any type of fireworks activities without having submitted an application for and having obtained a license from the State Fire Marshal in accordance with the provisions of this chapter. Licenses shall be processed in accordance with Title 19, California Code of Regulations, Section 3.33.

Exceptions:

(1) Licensed Pyrotechnic Operators Basic Commercial, Restricted Commercial and Rockets, First Class may employ unlicensed assistants. Unlicensed assistants shall perform only when under the direct, immediate and constant supervision of the licensee when handling fireworks and pyrotechnic compositions.

(2) Licensed special effects and theatrical pyrotechnicians may employ unlicensed assistants. Unlicensed assistants shall perform only when under the direct, immediate and constant supervision of the licensee when handling fireworks and pyrotechnic compositions.

(3) A license shall not be required for the use or discharge of safe and sane fireworks.

§981.1. Cause for Denial.

The use of any false or misleading statement or misrepresentation offered or used to secure any fireworks license, permit, classification, registration or any other official fireworks document is a violation of these regulations, and shall be cause for denial of the license, permit, classification, registration or other official fireworks document.

§981.2. Misuse or Alteration of License.

All fireworks licensees as set forth in this chapter shall be prohibited from giving or permitting any other person to use such license for any purpose whatsoever.

Any license issued under this chapter found to be altered shall be confiscated by the authority examining the license. The authority confiscating the license shall notify the State Fire Marshal immediately, and shall cooperate with the State Fire Marshal in all matters relating to an investigation of the incident.

§981.5. License Scope.

(a) Model Rockets. A Model Rocket License authorizes the manufacture, import, export or wholesale or any combination thereof.

(b) Pyrotechnic Operator. A Pyrotechnic Operator's License authorizes and places the responsibility for the handling, supervision and discharge of any fireworks item or pyrotechnic device and establishes that the operator is responsible for the training of his or her assistants in the safe handling, supervision, and discharge of these items and devices, in accordance with the following:

(1) Pyrotechnic Operator—Unrestricted may conduct and take charge of all fireworks activities in connection with every kind of public fireworks display, whether commercial entertainment, experimental and other types of rockets, special effects in motion picture, theatrical and television production.

(2) Pyrotechnic Operator—Basic Commercial may conduct and is restricted to all fireworks activities in connection with a commercial fireworks public display, including the determination that all mortars, set pieces, rocket launchers and rockets are properly installed and that the proper safety precautions have been taken to ensure the safety of persons and property. Such operator shall have charge of all activities directly related to handling, preparing and firing all fireworks at the public display, including the fixing of lifting charges and quick match as needed for aerial shells.

(3) Pyrotechnic Operator—Restricted Commercial may conduct and is restricted exclusively to the use and discharge of firecrackers and the use of other exempt fireworks in religious ceremonies.

(4) Pyrotechnic Operator—Rockets First Class may conduct and is restricted to all activities in connection with research experiments, production, transportation, fuel loading and launching of all types of experimental rockets. Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(5) Pyrotechnic Operator—Rockets Second Class may conduct and is restricted to all activities in connection with research experiments, production, transportation, fuel loading and launching of all types of solid fuel experimental rockets only.

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Such operator shall also be responsible for the actions and conduct of all assistants. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(6) Pyrotechnic Operator—Rockets Third Class may purchase, transport, store and launch high power rockets. Experimental high power rocket motors may only be imported, exported and wholesaled by individuals or companies holding valid import, export or wholesale licenses. Pyrotechnic Operators--Third Class may only purchase high powered rocket motors from licensed wholesalers. Operators licensed under subsection (b) are also required to obtain a local permit from the authority having jurisdiction prior to all launches.

(7) Pyrotechnic Operator—Special Effects First Class may conduct and is restricted to the use, preparation for transportation and the preparation and use of all types of fireworks and special effects pyrotechnics, for the sole purpose of producing a visible or audible effect where and when such use is a necessary part of motion picture, television, theatrical or operatic production, as permitted by the fire authority having jurisdiction.

(8) Pyrotechnic Operator—Special Effects Second Class may conduct and is restricted to the use of special effects, the loading of blank cartridges, colored fire, flash paper, smoke composition, the preparation and use of binary A and B Flash composition and such other fireworks of whatever kind and class as may be permitted by the authority having jurisdiction, under a special permit in connection with television and motion picture production.

(9) Pyrotechnic Operator—Special Effects Third Class authorizes the loading of blank cartridge shells, and use of special effects when under the direct supervision and control of a Pyrotechnic Operator--Special Effects First or Second Class.

(10) Pyrotechnic Operator—Theatrical authorizes the use of special effects, blank cartridges, colored fire, flash paper, flash, smoke composition, and the preparation and use of binary A and B Flash composition in stage or theatrical productions only.

(11) Pyrotechnic Operator—Theatrical Trainee authorizes the conducting of procedures permitted a Pyrotechnic Operator--Theatrical when under the direct supervision and control of a licensed Pyrotechnic Operator--Theatrical.

(12) Pyrotechnic Operator—Performer is restricted to persons who perform before an audience, directly or indirectly, and may include magicians, comedians, still photographers and others whose primary interest is in other than pyrotechnics. Such license is restricted to the use of blank cartridges, colored fire, flash paper, sparklers and smoke composition in connection with the production of theatricals and operas before live audiences in theaters, opera houses, television studios, night clubs and similar occupancies, or by the use of a still photographer.

(c) Separate License Not Required. A separate license shall not be required of licensed manufacturers, wholesalers or importer-exporter to manufacture, wholesale, import or export agricultural and wildlife fireworks or model rocket engines.

(d) Explosive Materials Not Included in Scope of License. The license scope as defined in this section is restricted to the use of materials defined as "fireworks" (as defined in Health and Safety Code Section 12511) and in no way confers authority for the use or discharge of explosive materials defined in Health and Safety Code Sections 12000, et seq.

Article 4. Permits

§982. Local Permit, Application For.

(a) When applying for a permit under Health and Safety Code section 12640(e), an applicant shall submit the following information and evidence to the authority having jurisdiction:

(1) The name of the organization sponsoring the display, together with the names and license numbers of persons actually in charge of the display.

(2) The date and time of day the display is to be held.

(3) The exact location planned for the display.

(4) The size and number of all fireworks to be discharged including the number of set pieces, shells and other items. Shells shall be designated by diameter specifying single, multiple break or salute.

(5) The manner and place of storage of all fireworks prior to, during and after the display.

(6) Diagram of the grounds on which the display is to be held showing the point at which the fireworks are to be discharged, the location of all buildings, roads and other means of transportation, the lines behind which the audience will be restrained, the location of all nearby trees, telegraph or telephone lines or other overhead obstruction.

(7) Proof that satisfactory workers' compensation insurance is carried for all employees in compliance with Labor Code Section 3700.

(8) If the permit is for a public display or special effects, documentary proof of conformance with sections 12610 and 12611, Health and Safety Code.

(9) A State Fire Marshal's license for the public display of fireworks, under Health and Safety Code Sections 12575, 12576 or 12577. No permit for a public display of any type shall be granted unless a public display license general, special or limited has been first obtained from the State Fire Marshal.

(10) The name and license number of the wholesaler who supplied all items used in the display.

(b) Permittee shall be responsible for compliance with the provisions under which a public display permit has been granted.

Article 6. Classification of Fireworks

§986. Classification.

(a) Fireworks or pyrotechnic devices that are to be used or sold for use in this state and found by the State Fire Marshal to come within the definition of "party poppers", "snap caps", "safe and sane", "agricultural and wildlife", "model rocket motors", "high power rocket motors", "emergency signaling device" or "exempt" fireworks shall be classified as such by the State Fire Marshal.

***Exception:** Special Effects items developed and compounded on location for single time usage.*

(b) The classification of an item shall not be construed as conferring classification to any similar item without the approval of the State Fire Marshal. The trade name of an item shall not be changed without notifying the State Fire Marshal 30 days prior to such change.

§986.1. Sparklers.

Sparklers, which are defined as a stick or wire coated with a pyrotechnic composition that produces a shower of sparks upon ignition, are classified as dangerous fireworks under the authority of Health and Safety Code section 12505(k).

Article 8. Storage

§989. General.

All magazines shall meet the requirements as set forth in the Code of Federal Regulations, Title 27, Part 55, Subpart K (Storage).

§989.1. Storage, General Provisions.

(a) All fireworks, pyrotechnic compositions and pyrotechnic devices shall be kept in a locked magazine and in a manner approved by the authority having jurisdiction unless they are:

(1) In the process of being manufactured;

(2) In the process of being used; or

(3) Being transported to a place of storage or use by a licensee, in accordance with the Code of Federal Regulations, Title 49, Part 173, Subpart C, and Title 13, Chapter 6, Article 3 of the California Code of Regulations.

(b) Class C Common Fireworks and those devices designated as "safe and sane" fireworks shall be stored in a manner consistent with the Code of Federal Regulations, Title 49, Section 173.88.

§989.2. Access Roads and Signs.

All magazine storage sites shall have access roads suitable for use by fire apparatus posted with the following warning sign or other sign approved by the authority having jurisdiction:

DANGER!
NEVER FIGHT EXPLOSIVE FIRES.
EXPLOSIVES ARE STORED ON THIS SITE
CALL _____

The sign shall be weather-resistant with a reflective surface and lettering at least two (2) inches high.

§989.3. Activities and Devices Prohibited.

Smoking, matches, flame-producing devices, open flames and firearms shall not be permitted inside or within fifty (50) feet of magazines.

§989.4. Magazines in Dwelling Prohibited.

No loaded indoor storage magazine shall be located in a residence or dwelling.

Article 13. General Safety Requirements

§991. Safety Inspection.

Retail fireworks stands and sales areas are subject to inspection by the authority having jurisdiction. All areas where fireworks, pyrotechnic compositions or devices are used, stored or discharged shall be free from any condition which increases, or may cause an increase of, the hazard or menace of fire or explosion to a greater degree than customarily recognized as normal by persons in the public service of preventing, suppressing or extinguishing fire, or which may become the cause of any obstruction, delay or hindrance to the prevention, suppression or extinguishment of fire.

§991.1. Disposition Unsold Stock.

All retail fireworks licensees shall return unsold fireworks stocks to the wholesaler from whom they were purchased. The retail licensee may store unsold stock in a place and manner approved by the fire authority having jurisdiction until stock is returned to the wholesaler. Such return of stock shall be accomplished no later than the thirty-first of July of each year.

§991.2. Personnel.

The employer or permittee shall be responsible for instructing his or her personnel who handle fireworks, pyrotechnic compositions or devices in any capacity, in the hazards of and safety procedures relating to fireworks, pyrotechnic compositions or devices as contained in this chapter.

§991.3. Smoking, Storage and Handling Facilities.

Smoking shall be prohibited and "No Smoking" signs posted in all portions of the premises or locations where fireworks, pyrotechnic compositions or devices are stored or handled.

§991.4. Smoking, Sales Facilities.

Smoking shall be prohibited and signs bearing the words "No Smoking" shall be posted on and in every building, mobile facility or structure used for the sale of fireworks. Signs shall be positioned at the entrance to and inside such buildings, mobile facilities or structures, and at such other locations as designated by the authority having jurisdiction. Lettering shall be red in color on a white background. Letters shall be at least 3 inches in height with a stroke of at least $^1/_2$ inch.

§991.5. Prohibited Substances.

Intoxicating liquids, narcotics and controlled substances are prohibited within the area of the firing site as determined by the authority having jurisdiction, and shall not be used by any person handling fireworks or special effects at any time during transportation, set-up, firing or removal.

***Exception:** Prescription drugs not impairing the motor functions and/or judgment of the persons affected by this section. Drugs must be taken as directed and specifically prescribed for the individual to be covered by this exception.*

§991.6. Alcohol and Narcotics.

Article 13.5. Electrical Firing Circuits

§992. Electric Firing Circuits, General.

Connecting any electric firing circuit to any power supply, is prohibited until all special effects devices, fireworks and pyrotechnics in the sequence are connected to firing leads and the firing area is clear of all unauthorized personnel.

***Exception:** Circuit testing as described in section 992.3.*

§992.1. Power Sources.

§992.2. Firing Systems Safeguards.

Power sources for firing special effects devices, fireworks and pyrotechnics shall be restricted to batteries or individually isolated, ungrounded generators used for firing purposes only.

Commercial or house power may be used provided the firing system is electrically isolated from the commercial or house power through the use of such items as isolation transformers. Under no condition may commercial or house power be used directly for firing purposes.

All firing systems, including battery and power circuit types, shall be designed to ensure against accidental firing by providing, a shunt or other control method in which no firing power may be applied to any firing circuits unless the operator intentionally enables or arms the firing system before applying firing power.

§992.3. Circuit Tests.

All electrically fired pyrotechnic circuits shall be tested with a galvanometer or other test device in which the test current is not capable of firing the pyrotechnic device being tested.

§992.4. Sight Firing.

Special effects devices and pyrotechnics shall not be fired unless the area involved with the firing is in the continuously unobstructed full view of the pyrotechnic operator or his/her assistant at the time of firing.

Article 14. Special Effects

§992.5. Scope.

This article shall govern all "Special Effects Devices/ Materials" including those materials which have been classified and described by the regulations of the Department of Transportation, Title 49, parts 172, 173 and 177 as Special Fireworks Class B Explosives and Common Fireworks Class C Explosives and such additional items as listed in Table 14A.

§992.6. Responsibility.

The company representative shall provide to the authority having jurisdiction the name and license number of the special effects operator who shall have the authority, responsibility and be in charge of handling all Special Effects Materials. The company representative shall also allocate sufficient time to the Special Effects Pyrotechnic Operator to prepare for the transportation, packing, storing, securing daily, discharging, disposing of, or otherwise handling of fireworks, pyrotechnic devices or materials in a safe manner. Upon completion of firing, no unauthorized person shall be permitted access to the firing area until the licensed pyrotechnic operator has determined the area to be safe and secure.

§992.7. Orientation Meeting.

The company representative shall provide to the authority having jurisdiction the name and license number of the special effects operator who shall have the authority, responsibility and be in charge of handling all Special Effects Materials. The company representative shall also allocate sufficient time to the Special Effects Pyrotechnic Operator to prepare for the transportation, packing, storing, securing daily, discharging, disposing of or otherwise handling of fireworks, pyrotechnic devices or materials in a safe manner. Upon completion of firing, no unauthorized person shall be permitted access to the firing area until the licensed pyrotechnic operator has determined the area to be safe and secure.

Prior to the activity, a discussion of the events planned and all aspects and ramifications concerning safety issues as they relate to the safe use of fireworks, pyrotechnic devices and materials shall be held among all appropriate parties, as determined by the authority having jurisdiction.

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§992.8. Special Effects Materials.

(a) Materials described in this chapter as Special Effect Materials can be used as Special Effects. Other hazardous materials may be used when so authorized by the authority having jurisdiction.

§992.9. Storage and Working Supplies.

(a) Special Effects Materials storage facilities shall be used exclusively for the storage of Special Effects Materials. Storage facilities shall not be used for the assembling, compounding or manufacture of Special Effects Materials or any other item of fireworks. Magazines shall be kept locked at all times except when supplies are being withdrawn or replenished. Special Effects Materials shall be stored in accordance with the Code of Federal Regulations, Title 27, Part 55, Subpart K.

§992.10. Quantities.

(a) The quantities of special effects materials removed from magazines shall be limited to the amount necessary for immediate use. Under no condition shall any surplus or excess be permitted to remain outside a magazine, unless under the direct supervision of a licensed pyrotechnic operator.

§992.11. Equipment.

All tools, scoops and devices used in loading and handling Special Effects Materials shall be made of non-sparking materials.

§992.12. Mixing.

No persons shall mix any Special Effects Material except a licensed manufacturer or a licensed Special Effects Pyrotechnic Operator—First Class. All mixing, assembling or compounding when done by other than a licensed manufacturer shall be conducted in accordance with the applicable provisions of this chapter and with approval of the authority having jurisdiction.

***Exception:** Binary A & B Flash composition pre-packaged by a licensed manufacturer may be mixed and utilized according to manufacturer's instructions by a Pyrotechnic Operator, Special Effects—Second Class or Pyrotechnic Operator, Theatrical.*

§992.13. Special Effects Water Locations.

All special effects devices and explosive charges set in or on the surface of water, either salt or fresh or any other liquid, shall be fired by a separate, individual, ungrounded and uncommon two-wire circuit.

§992.14. Special Effects Not Allowed To Be Carried in Wearing Apparel.

No Special Effects Materials other than blank cartridges may be carried within the wearing apparel of a person. This shall not apply to actors portraying a scene in a theatrical, television or film production.

§992.15. Special Effect Packaging.

All Special Effects Materials shall be packaged in accordance with Department of Transportation standards as contained in Title 49 of the Code of Federal Regulations, parts 172, 173 and 177 and shall remain in the prescribed containers until used or placed in a magazine.

§992.16. Special Effects Mortars.

Mortars and other items used to hold special effects, pyrotechnic or explosive materials during discharge shall be made of a material having a thickness proportional to the strength of the explosive or pyrotechnic material being used, and in every case sufficient to prevent distortion in service. Tubular mortars for firing aerial pyrotechnic and fireworks shells shall conform to the requirements of article 15 of this chapter.

§992.17. Flash Powder Mortars.

The use of special effects flash powder mortars consisting of converted switch boxes, sockets or similar components is prohibited.

§992.18. Special Effects Reports.

(a) Verbal reports shall be made to the State Fire Marshal within 24 hours after a firing under this article when either of the following events occur:

(1) Injury or death to the public or the crew as a result of the firing.

(2) Fires requiring emergency action or response.

(b) Within ten (10) working days following an incident giving rise to a verbal report, the licensed pyrotechnician in charge of the activity shall submit a complete, accurate and factual report directly to the State Fire Marshal on the episode.

§992.19. Shunts.

§992.20. Firing Safeguards

§992.22. Water Locations.

§992.21. Circuit Tests.

§992.23. Sight Firing.

Table 14A Special Effects Materials

The following materials, when used in the motion picture/television/theatrical industry by licensed special effects pyrotechnicians and when permitted by the authority having jurisdiction, are to be regulated under this chapter as fireworks, pyrotechnic materials and devices and not as explosives under Health and Safety Code Section 12000.

BULK POWDER COMPOSITIONS AND DEVICES
Black Powder Smokeless Powder

Smoke Flash Compositions
Common Photo Flash Compositions
Illuminating Compositions
Atomized Flash Compositions
Two Component Flash Powder
Flash Paper
Flash Cotton
Flash Powder
Simulated Phosphorus
Sparking Granules
Lifters

SMOKE POWDER COMPOSITION AND DEVICES
All Colors
Smoke Compositions
Smoke Pellets
Smoke Granules
Smoke Candles
Smoke Cookies
Smoke Grenade
Smoke Pots
Smoke Signals

MATCHES AND FUSES
Quick Match
Black Match
Arcing Match
Silver Match
Cannon Fuse
Safety Fuse
Thermalite
Instantaneous Fuse
Igniter Cord

SQUIBS AND DETONATORS
Bullet Hits
Electric Match
Soft Detonators
Squibs
Detonators
Igniters

FIREWORKS
Common Class C Safe and Sane Fireworks
Common Class C Dangerous Fireworks
Special Class B Fireworks

OTHER MATERIALS
Primacord or Detonating Cord
Exploding Bolts and Cable Cutters
Non Electric Fuse
Shape Charges
Trick Noise Makers

Article 15. Public Display

§993. Insurance.

(a) Any person, firm or corporation applying for a public display license shall furnish to the State Fire Marshal a policy of public liability and property damage insurance. The policy may have a deductible not to exceed fifteen thousand dollars ($15,000). The policy shall provide limits of bodily injury and property damage liability of not less than one million dollars ($1,000,000.00) combined single limits for each occurrence annually as payment for damages to persons or property which may result from or be caused by such public display of fireworks, or any negligence on the part of the licensee or his or its agents, servants, employees or subcontractors presenting such public display.

***Exception:** A deductible in excess of fifteen thousand dollars ($15,000) may be permitted provided a security deposit, such as, but not limited to a surety bond, pledge of assets or bank letter of credit covering the value of the excess, is approved by the State Fire Marshal.*

(b) The certificate of insurance shall provide all of the following:

(1) That the insurer will not cancel the insured's coverage without 15 days prior written notice to the State Fire Marshal.

(2) That the duly licensed pyrotechnic operator required by law to supervise and discharge the public display, acting either as an employee of the insured or as an independent contractor and the State of California, its officers, agents, employees and servants are included as additional insurers, but only insofar as any operations under this chapter are concerned.

(3) That the State shall not be responsible for any premium or assessments on the policy.

§993.1. Reports. General public display and special public display licensees shall report to the State Fire Marshal prior to date of each display all public displays of fireworks contemplated under their license. Licensee must report to the State Fire Marshal at least 72 hours prior to each display on state-owned or state-occupied property. Applicants for limited public display licenses shall report at the time of applying for their license. The report shall contain the information set forth in Section 982.

Exception: A general public display licensee conducting special effects activities for motion picture, television and theatrical productions need not comply with any of the above reporting requirements.

§997. Pyrotechnic Operators, Basic Commercial, Responsibilities.

(a) No basic commercial public display permit shall be granted unless there is a licensed basic commercial pyrotechnic operator and at least one additional experienced person present. Pyrotechnic Operators, Basic Commercial, shall:

(1) Be responsible for and have control over on-site unloading, storing and security of all fireworks;

(2) Be responsible for placement of mortars, set pieces and all other fireworks on-site as approved by the authority having jurisdiction. No fireworks shall be discharged over areas occupied by spectators;

(3) Ensure that no person under the age of 18 is in the firing or fireworks storage sites;

(4) Be in possession of a current basic commercial license at the time of display; and

(5) Be responsible for and have control over the safe return of all unfired fireworks, misfires and duds.

§999. Mortars, Aerial Shells

(a) General.

(1) Electric firing shall be required for all mortars eight inches (8") or greater in diameter.

(2) Multiple-break shells that include a salute as one of the breaks shall be fired in HDPE mortars only.

(b) Steel Mortars.

(1) Steel Mortars shall be constructed of commercially manufactured, first quality electric resistance weld (ERW) or drawn over mandrel (DOM) steel tubing conforming to ASTM Standard A135-83, which is incorporated by reference. Mortars constructed of cast iron, other fragmenting types of steel and all other types of metal are prohibited. Salutes shall not be fired from metallic mortars.

(2) Steel mortars shall have a base plate the same thickness of the mortar wall, welded continuously around its perimeter.

(3) The inside length of steel mortars shall meet the minimum specifications set forth below:

Shell Size	Inside Length
1.99 inches or less	8 inches
2 inches	13 inches
$2\frac{1}{2}$ inches	13 inches
3 inches	15 inches
4 inches	20 inches
5 inches	25 inches
6 inches	30 inches
7 inches	32 inches
8 inches	32 inches
10 inches	40 inches
12 inches	40 inches
16 inches	64 inches
24 inches	96 inches

(4) Mortars shall not have any visible cracks in the body of the tube, nor any cracks or voids in the weld around the base plug. Mortars shall not be dented or distorted beyond the point that such distortion interferes with the smooth and unimpeded travel of the shell throughout the entire length of the mortar.

(c) Paper Mortars.

(1) Reusable paper mortars shall be of spiral or convolute wound kraft paper or chipboard, and shall meet the minimum specifications set forth below:

Shell Size	Wall Thickness	Inside Length	Base Plug*
Less than 2 inches	$\frac{1}{8}$ inch	8 inches	1 inch
2 inches	$\frac{1}{4}$ inch	13 inches	2 inches
$2\frac{1}{2}$ inches	$\frac{3}{8}$ inch	13 inches	3 inches
3 inches	$\frac{3}{8}$ inch	15 inches	3 inches
4 inches	$\frac{1}{2}$ inch	20 inches	3 inches
5 inches	$\frac{1}{2}$ inch	25 inches	4 inches
6 inches	$\frac{1}{2}$ inch	30 inches	4 inches
7 inches	$\frac{3}{4}$ inch	32 inches	4 inches
8 inches	$\frac{3}{4}$ inch	32 inches	4 inches

*Sizes for base plugs are nominal.

(2) Base plugs for paper mortars shall be wooden and securely glued, as well as nailed, screwed or bolted to the base of the mortar. Base plugs shall be discarded and replaced when damaged. Minor cracks and checks are acceptable.

(3) Multiple-break shells shall not be fired from paper mortars.

(d) HDPE Mortars. High Density Polyethylene (HDPE) mortars shall meet the minimum specifications set forth below:

Shell Size	*Wall Thickness*	*Inside Length*	*Base Plug**
Less than 2"	*1/8 inch*	*10 inches*	*1 inch*
2 inches	*1/4 inch*	*13 inches*	*2 inches*
2 1/2 inches	*1/4 inch*	*13 inches*	*3 inches*
3 inches	*1/4 inch*	*15 inches*	*3 inches*
4 inches	*1/4 inch*	*20 inches*	*3 inches*
5 inches	*1/4 inch*	*25 inches*	*4 inches*
6 inches	*3/8 inch*	*30 inches*	*4 inches*
7 inches	*3/8 inch*	*32 inches*	*4 inches*
8 inches	*3/8 inch*	*32 inches*	*6 inches*

**Base plug sizes are nominal.*

HDPE Mortars shall not be reloaded for a period of at least one (1) hour after use. All base plugs for HDPE mortars shall be wooden and securely glued, as well as nailed, screwed or bolted to the base of the mortar. Base plugs shall be discarded and replaced when damaged. Minor cracks and checks are acceptable.

(e) Other Materials. Recognizing that new materials for the construction of mortars may be developed, such materials may be used when specifically approved by the State Fire Marshal. Persons wishing to use material not specifically covered in this section shall submit the material in an amount sufficient for testing to the State Fire Marshal for determination of its safety and its inclusion in this section.

For illustrations of typical mortar racks, troughs and drums, see Diagrams A, B and C following Section 1002.

§1001. Setting Mortars.

(a) Metallic, re-usable paper and HDPE mortars shall be securely buried to a minimum of 2/3 of their minimal legal length in earth or in drums or troughs filled with moist earth or sand essentially free of debris.

(b) Mortars other than metallic mortars may be placed in wooden finale racks.

(c) Planking below mortars shall be required when the base of the mortar, trough or drum is not on a stable and level surface.

(d) Mortars in non-electrically-fired shows shall meet all of the following requirements:

(1) Mortars up to five inches in diameter and buried in earth or placed in troughs or drums shall be spaced a minimum of 3 inches apart or from the sides of the drum or trough.

(2) Mortars six inches or larger in diameter and buried in earth or placed in troughs or drums shall be spaced a minimum of 5 inches apart or from the sides of the drum or trough. When a mortar requiring 5 inches of space is placed adjacent to a mortar requiring only 3 inches of spacing, the larger spacing shall apply.

(e) Mortars in electrically-fired shows shall meet all of the following requirements:

(1) All mortars buried in earth or placed in drums and troughs shall be nominally spaced 2 inches apart or from the sides of the drum or trough.

(2) All technicians shall be positioned a minimum of 100 feet from any mortar and positioned so as to be protected from the direct line of fire.

(3) No one shall be allowed to enter the firing area during the firing of the display.

(f) Mortars shall be set in a stable and secure manner so that accidental impact and shell discharge will not change the trajectory of adjacent unfired shells.

For illustrations of typical mortar racks, troughs and drums, see Diagrams A, B and C following Section 1002.

§1002. Design Specifications for Mortar Racks, Troughs, Drums and Ready Boxes.

(a) Mortar racks shall be limited to a maximum of 10 tubes per unit. The base and ends of the rack shall be nominal 2 inch thick lumber. The inside width shall be equal to the outside diameter of the mortar tube. Each mortar tube shall be separated by horizontal or vertical blocks nominally 2 inches thick and 4 inches wide. Side braces for mortar racks of 3 inch size mortars and up shall be 1 inch x 6 inch nominal lumber or 1/2 inch x 4 inch plywood securely fastened by nails, screws or attached with construction grade staples along the top and bottom of the rack. A diagonal side brace must be employed on all mortar racks with more than 5 mortar tubes. Mortar racks shall not incorporate steel brackets or other metallic parts in their construction with the exception of nails, screws or construction-grade staples. Metallic braces shall not be fastened to mortar racks at the firing site.

(b) Troughs shall not be more than 8 feet in length. Troughs may be placed in a continuous row provided they are stable and secure. The sides, bottom and ends of troughs shall be minimum 3/4 inch plywood or nominal 2 inch lumber, except in cases where the surface at the bottom of the trough is sufficiently stable to support the firing of the mortar, no bottom shall be required. Troughs shall be secured by minimum 3/8 inch through bolts, rods or angle iron "U" brackets at each end and center to prevent bulging.

(c) Drums shall be constructed of steel, aluminum or plastic.

(d) Ready boxes shall be constructed of wood not less than 1/2 inch thickness or 3/8 inch plywood, chipboard or presswood. Ready boxes shall not be equipped with any type of hold open device.

Note: *For illustrations of typical mortar racks, troughs and drums, see Diagrams A, B and C immediately following this section.*

DIAGRAM A

DIAGRAM OF A TYPICAL RACK

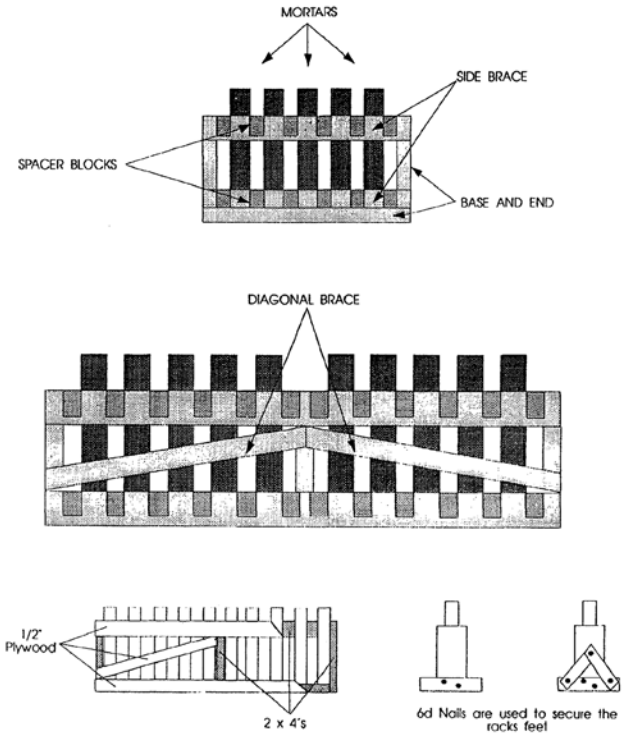
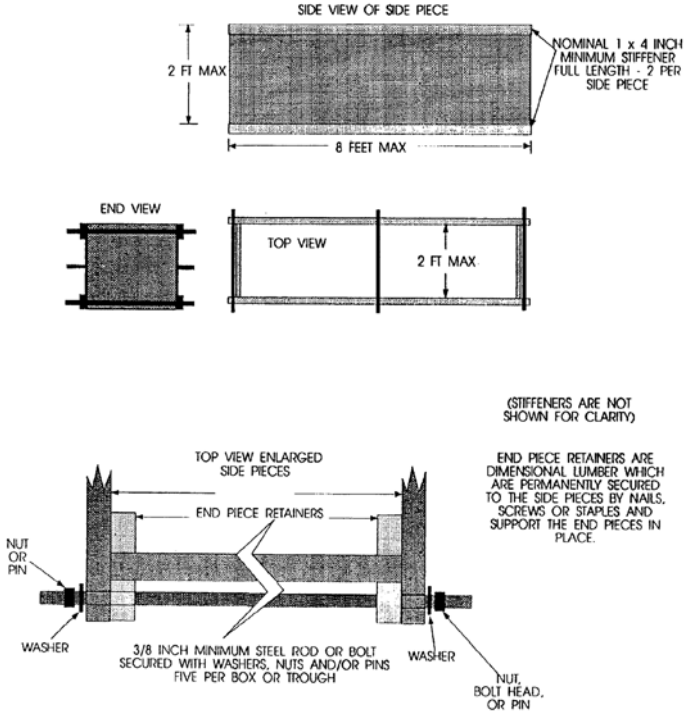


DIAGRAM B

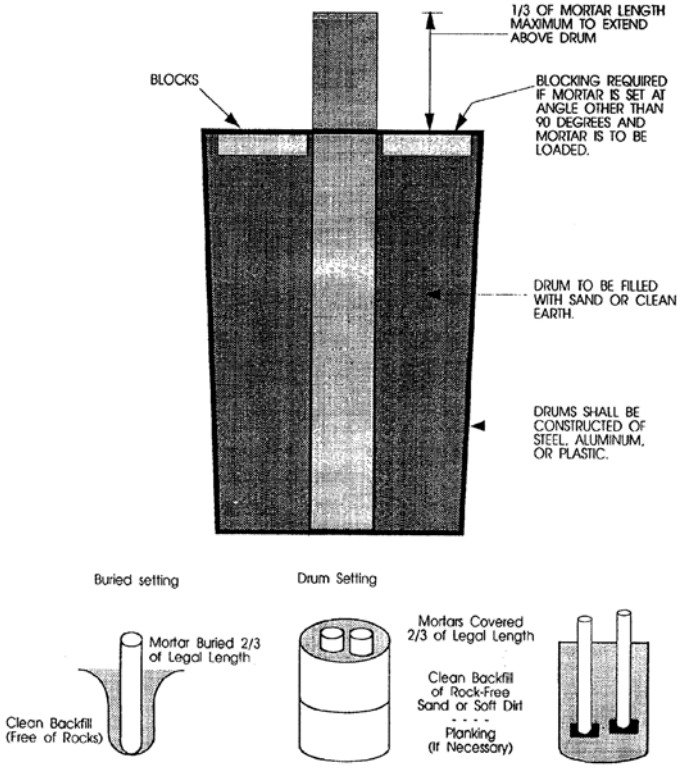
DIAGRAM OF A TYPICAL TROUGH SETTING


SIDE VIEW OF SIDE PIECE
2 FT MAX
NOMINAL 1 x 4 INCH MINIMUM STIFFENER FULL LENGTH - 2 PER SIDE PIECE
8 FEET MAX
END VIEW
TOP VIEW
2 FT MAX
(STIFFENERS ARE NOT SHOWN FOR CLARITY)
TOP VIEW ENLARGED SIDE PIECES
END PIECE RETAINERS
END PIECE RETAINERS ARE DIMENSIONAL LUMBER WHICH ARE PERMANENTLY SECURED TO THE SIDE PIECES BY NAILS, SCREWS OR STAPLES AND SUPPORT THE END PIECES IN PLACE.
NUT OR PIN
WASHER
3/8 INCH MINIMUM STEEL ROD OR BOLT SECURED WITH WASHERS, NUTS AND/OR PINS FIVE PER BOX OR TROUGH
WASHER
NUT, BOLT HEAD, OR PIN

INTERNATIONAL CODE COUNCIL®

DIAGRAM C

DIAGRAM OF A TYPICAL DRUM SETTING


1/3 OF MORTAR LENGTH MAXIMUM TO EXTEND ABOVE DRUM
BLOCKS
BLOCKING REQUIRED IF MORTAR IS SET AT ANGLE OTHER THAN 90 DEGREES AND MORTAR IS TO BE LOADED.
DRUM TO BE FILLED WITH SAND OR CLEAN EARTH.
DRUMS SHALL BE CONSTRUCTED OF STEEL, ALUMINUM, OR PLASTIC.
Buried setting
Drum Setting
Mortar Buried 2/3 of Legal Length
Clean Backfill (Free of Rocks)
Mortars Covered 2/3 of Legal Length
Clean Backfill of Rock-Free Sand or Soft Dirt
Planking (If Necessary)

§1003. Operation of Display.

(a) General.

(1) All fireworks at a display site shall be stored in a place and manner secure from fire, accidental discharge and theft. All storage shall be approved by the authority having jurisdiction.

(2) Shells shall be sized for proper fit and for damaged lift charge bags, lead fuse tears, tears in the piping of the quick match leaders and missing safety caps.

(3) Safety caps protecting the fuse shall not be removed until firing or electric hookup.

(b) Ready Boxes.

(1) Shells used for reloading shall be placed in ready boxes prior to the start of the display.

(2) Ready boxes shall not be located less than 25 feet upwind from the nearest mortar prior to any firings.

(3) Ready boxes shall be divided into separate compartments for each shell size.

(4) When containing shells, ready boxes shall be set with the bottom facing the mortars with the front elevated, or set on the bottom with the hinges towards the mortar, providing the lid cannot be opened fully.

(5) Once in place, the ready box shall be covered with a flame-resistive water-repellant canvas cover.

(c) Loading Mortars.

(1) At no time shall any person place any part of their body over the mortar muzzle during loading or firing.

(2) Mortars shall be cleaned of debris or burning material prior to loading, and prior to reloading, as necessary.

(3) Mortar racks may be reloaded with non-chained single-break shells when there is no longer any burning material in the racks.

(4) Finale racks shall have tape placed over the mortar muzzles when loaded with finale chained shells.

(5) Salutes and detonating shells shall not be fired from steel mortars.

(6) Multiple-break shells that include a salute as one of the breaks shall be fired from HDPE mortars only.

(d) Firing.

(1) All firing shall be done upon order or signal of the licensed pyrotechnic operator controlling the display.

(2) Electric firing, if utilized, shall comply with all of the requirements of Article 13.5 of this chapter.

(3) Upon conclusion of firing, no unauthorized person shall be permitted access to the firing area until the licensed pyrotechnic operator has determined the area to be safe and secure.

(4) Electric firing shall be required for all mortars eight inches (8") or greater in diameter.

(e) Ground Effects.

(1) Set pieces, wheels and mechanical devices shall be braced, guyed and securely attached or set as required to prevent displacement.

(2) Low level Roman Candles, multiple batteries and projectiles shall be securely set to prevent accidental displacement.

(f) Duds.

(1) The licensed pyrotechnic operator shall account for and retrieve all duds immediately following the display.

(2) The entire firing range shall be inspected immediately following the display to locate any duds. Any shells found shall be immediately doused with water before handling. The shell shall then be placed in a separate container filled halfway with water.

(g) Misfires.

(1) When a shell misfires, and the fuse has burned, but the lift change has not functioned, the mortar shall be identified and marked, and left undisturbed for a minimum of 5 minutes, then filled halfway with water.

(2) When the shell misfires due to electric malfunction, and the fuse has not yet burned, the shell shall be removed and stored pursuant to the permit.

(3) When the display is concluded, the misfired shell shall be placed in a safe area pursuant to the permit.

(h) Unfired shells, including duds and misfires, must be removed immediately following the display and returned directly to the wholesaler/manufacturer unless provision has been made for storage and/or destruction with the authority having jurisdiction.

§1004. Safety Tools and Equipment.

(a) Tools required at the display site shall be, at a minimum, a shovel, a serviceable pressurized water fire extinguisher, a bucket or other container to soak duds, and any other equipment as required by the authority having jurisdiction.

(b) Any person manually discharging aerial shells shall wear at a minimum a hard hat, eye protection, long sleeved shirt, gloves, long pants and shoes or boots, and have available ear protection, as required by the authority having jurisdiction.

§1005. Post Display.

(a) Reports.

(1) Within ten (10) working days following any public display, the licensed pyrotechnician in charge of the display shall submit a complete, accurate and factual written report directly to the State Fire Marshal, covering:

(A) A brief report of any duds or misfires including manufacturer's name, type and size;

(B) A brief account of the cause of injury to any person from fireworks and such person's name and address;

(C) A brief account of any fires caused by fireworks;

(D) Any violations of the Health and Safety Code or of these regulations relating to public display fireworks; and

(E) The names of all licensed and unlicensed assistants.

***Exception:** A general public display licensee conducting special effects activities for motion picture, television and theatrical productions need not comply with the requirements of subsections (A) and (E).*

(b) Notification. Verbal reports are required within 24 hours to the State Fire Marshal when any of the following occur:

(1) Fire requiring emergency action or response as a result of the firing; or

(2) Injury or death to the public or crew. Within ten (10) working days following an incident giving rise to a verbal report, the licensed pyrotechnician in charge of the activity shall submit a complete, accurate and factual report directly to the State Fire Marshal on the event.

(c) Unfired Shells. Unfired shells shall either be removed following the display and returned directly to the wholesaler or supplier or stored in a manner approved by the authority having jurisdiction until such time as the shells can be transported directly to the wholesaler or supplier.

***§1006. Smoking.** No person shall smoke in any area where fireworks are handled or stored.*

SECTION 5609—TEMPORARY STORAGE OF CONSUMER FIREWORKS

5609.1 General. Where the display or temporary storage of fireworks 1.4G (consumer fireworks) is allowed by Section 5601.1.3, Exception 4, such display or storage shall comply with the applicable requirements of NFPA 1124.

SECTION 5610—EXPERIMENTAL ROCKETS/UNLIMITED

[California Code of Regulations, Title 19, Division 1, §1010-1015]

Article 16. Experimental Rockets/Unlimited

***§1010. General.** This article applies to all rockets except approved model rockets as defined in Article 14 and experimental high power rockets and experimental high power rocket motors as defined in Article 2.*

§1011. Test Areas.

(a) Experimental rockets unlimited shall not be launched within this State from any site other than test areas approved for such purpose by the fire authority having jurisdiction.

(b) These test areas shall meet the following minimum requirements:

(1) Test areas shall consist of a launching site and an impact range.

(2) The launching site is that area immediately surrounding the launching devices, including positions to protect all personnel.

(3) The impact range is that area over which rockets may travel by design or accident and upon which they fall. Its length should be not less than the maximum calculated ideal ballistic range of any rocket to be fired from its launching site and extends as the radius of a circular sector 90 from the launching site apex into the prevailing wind.

(c) Test areas should include no dwellings or structures other than those provided for operating and nonoperating personnel protection and loading rockets.

(d) Operating personnel protection shall consist of a bunker, blockhouse or similar protection designed to withstand shrapnel and mass impact equal to the potential created by the heaviest rocket intended to be fired, and falling from its zenith or exploding at any point. This bunker when located not less than 50 feet distant from the launching device shall afford minimum protection equal to a 2-foot wide slit trench not less than 5 feet deep and parapet observation ports with protection equal to a double thickness of sand bags. Overhead protection should consist of substantial structural materials, and these materials shall be covered to afford protection equivalent to that of a double layer of filled sand bags. Non-operating personnel minimum protection when located not less than 250 feet distant from the launching device shall consist of construction at least equal to the slit trench shelter described above.

(e) Rocket loading facilities shall be housed in a lightly constructed and covered structure located not less than 100 feet distant from any other structure including any launching device. Within this State, all fuel or propellant compounding or loading of experimental rockets unlimited shall be performed by licensed pyrotechnic operators or by experienced persons directly supervised by these pyrotechnic operators.

§1012. Rocket Launchers. *Rocket launchers shall have a length sufficient to ensure stabilization to any rocket fired from them and shall be constructed of appropriate material such as metal or rigid flame-resistant plastic and designed for the specific intended purpose and use. Special protection shall be provided for persons setting and arming all rockets. The use of any two rail, "V" or "U" trough launcher, which depends solely on gravity to control the rocket during launching is prohibited.*

§1013. Setting Rocket Launchers. *All adjustments and alignments of the rocket launcher and connections shall be completed before the rocket is armed. Final rocket launcher adjustments shall be checked by the licensed pyrotechnic operator in charge.*

§1014. Firing Procedure. *A definite ordered firing procedure shall be established by the licensed pyrotechnic operator in charge. Both visible and audible signals shall be used to alert all persons in the test area. Any launch or firing code used shall be reduced to writing and posted conspicuously in the test area.*

§1015. Launching Rockets.

(a) Rockets may not be armed or launched except by an experienced pyrotechnic operator, who, if he or she is not licensed, shall be directly responsible to the licensed pyrotechnic operator in charge. The actual arming operation shall be accomplished by a competent person. During all arming operations all personnel shall take shelter when launching, excepting only the individual arming the rocket and his or her necessary assistants.

All internal self-contained firing circuits (within the rocket) including, but not by way of limitation, multiple stage ignition, parachute releases, bursting charges, etc., shall be provided with an arming and disarming device operable remotely from without the assembled rocket in the launching position.

(b) The firing circuit shall be shunted at both the control center and the launching site by the pyrotechnic operator assigned to arm the rocket. Both shunts shall be in place and he or she shall test them to ensure that the firing circuit is effectively short circuited, before the rocket is set in the launching position.

(c) The single special key, which removes the launching site shunt from the firing circuit, shall be the sole means for completing the firing circuit at the control center. The arming operator shall retain the shunt key in his or her personal possession from the time the circuit is initially shunted until the arming operations are completed and he or she removes the last shunt in the control center and establishes a ready firing circuit.

(d) No other means or device than a remotely controlled electric circuit of an approved design may be used to launch single stage rockets or the first stage of multistage rockets.

SECTION 5611—MODEL ROCKETS

[California Code of Regulations, Title 19, Division 1, §1020-1028]

§980 Definitions:

Model Rocket Motor. *The same as a model rocket engine, as defined in Health and Safety Code Section 12520. Model rocket motors shall not produce more than 160 Newton-seconds of total impulse power.*

Article 17. Model Rockets

§1020. General Rocket Launchers. *Nothing in this article is intended to regulate the sale or the construction of model rockets, provided that such model rockets are not equipped with a model rocket motor.*

§1021. Classification and Labeling. *All types of model rocket motors shall be submitted to the State Fire Marshal by a licensed model rocket motor manufacturer, importer/exporter or wholesaler for classification A copy of a certificate of classification indicating the item has been classified as a model rocket motor by a laboratory approved by the Department of Transportation shall accompany the*

request for classification by the State Fire Marshal. Three samples of each motor type shall be submitted to the State Fire Marshal for classification.

Standards for the classification of model rocket motors shall conform to the National Fire Protection Association (N.F.P.A.) 1122 (1987), Code for Unmanned Rockets, Sections 3-1.1, 3-1.2, 3-1.3, 3-1.4, 3-1.5, 3-1.6, 3-1.7, 3-1.8, 3-1.9, 3-1.10.

(b) Individual engines shall bear the California State Fire Marshal seal and the registration number of the licensee.

§1022. Model Rocket Standards and Use.

(a) Model rocket standards and use shall comply with: N.F.P.A. 1122, the Code for Unmanned Rockets, Chapter 3, Sections 3-1.1 through 3-1.10, Chapter 4, Chapter 5, Chapter 6 and Appendix A-2-(1987), which is incorporated by reference herein except for Appendices A-2.3 and A-2.4.

§1023. Storage and Sale. *No model rocket motors shall be stored, sold or offered for sale at retail unless such model rocket motors have been classified by the California State Fire Marshal.*

§1024. Restrictions. *The provisions of this article shall not be used to establish the authority to possess, launch or use experimental unlimited or experimental/high powered rocket motors.*

§1025. Authorization.

(a) No model rocket user shall launch any model rocket motor from any site without first securing authorization from the authority having jurisdiction. The authority having jurisdiction may require notification each time that model rockets are to be launched.

(b) It shall be the responsibility of the model rocket user to secure permission of the owner of private lands when such land is intended to be used to launch model rockets.

§1026. Revocation of Permits and Authorized Use of Launching Area. *The authority having jurisdiction may immediately revoke a permit to sell model rocket motors at retail if it is found that those persons granted a permit have violated these regulations. The authority having jurisdiction may immediately revoke its authorization to use a firing area if it is found that an undue hazard exists, including, but not limited to, fire safety hazards or life safety hazards.*

§1027. Minimum Age.

(a) No model rocket motors shall be sold, given or delivered to any person under 18 years of age.

Exceptions:

1. *Model rocket motors bearing the standardized coding 1/4A, 1/2A, A, B, C and D may be sold, given or delivered to any person 14 years of age or older.*
2. *Persons who are 12 years of age or older and who are taking part in a model rocket education program may receive model rocket motors and launch approved model rockets when under the direct supervision and control of a person 18 years of age or older. Model rocket motors must be obtained only from the adult in charge of the launching. Approved model rocket motors for this exception shall bear the motor coding 1/4A, 1/2A, A, B, C or D.*

§1028. Supervision. *The permittee shall be responsible for the safety of all spectators and other persons connected with the launching of model rockets.*

SECTION 5612—EXPERIMENTAL HIGH POWER ROCKETS AND MOTORS

[California Code of Regulations, Title 19, Division 1, §1030-1039]

§980 Definitions:

Experimental High Power Rocket. *Non-professional rockets which are propelled by commercially manufactured high-power solid propellant rocket motors.*

Experimental High Power Rocket Motor. *A State Fire Marshal approved, commercially manufactured rocket propulsion device containing a solid propellant charge wherein all the ingredients are pre-mixed and which produces more than 160 Newton-seconds (36 lb.-seconds) but shall not exceed 10,240 Newton-seconds (2302.2 lb.-seconds) of total impulse.*

Article 18. Experimental High Power Rockets and Motors

§1030. General. *This article is intended to regulate the sale, storage, construction and use of experimental high power rocket motors and experimental high power rockets.*

§1031. Classification and Labeling.

(a) All types of experimental high power rocket motors shall be submitted by a licensed experimental high power rocket motor manufacturer, importer/exporter or wholesaler to the State Fire Marshal for classification.

(b) All motors shall bear the State Fire Marshal seal and the registration number of the licensee. Classified motors contained within packages may have the State Fire Marshal seal and registration number on the package, provided that such packages are sealed.

§1032. Experimental High Power Rocket Motor Standards and Use.

(a) Experimental high power rocket motor design and construction standards shall comply with all of the following:

1. *The maximum total impulse per rocket motor shall not exceed 10,240 Newton-seconds (2302.2 lb.-seconds).*
2. *When more than one rocket motor is utilized, the combined total impulse shall not exceed 20,480 Newton-seconds (4604.4 lb.-seconds).*

(b) If an experimental high power rocket is equipped with an experimental high power rocket motor, then the rocket shall:

(1) be constructed of paper, plastic, rubber, aluminum or wood except that minor components such as screw eyes or motor mounts may be of other light-gauge metals; and

(2) include an effective means or device for returning the rocket safely to the ground without causing personal injury or property damage; and

(3) The rocket shall not contain any type of explosive or pyrotechnic warhead of any type.

(c) An experimental high power rocket shall not be used as a weapon.

§1033. License Required. *No person shall possess, receive, transport, store or launch any experimental high power rocket motor without first securing a valid license as a Pyrotechnic Operator—Rockets First, Second or Third Class from the State Fire Marshal. No person shall sell an experimental high power rocket motor to any person unless the seller possesses a valid license as a wholesaler or retailer under this chapter.*

§1034. Local Permit Required—Seller. *No person shall sell an experimental high power rocket motor without first securing a permit from the authority having jurisdiction. This permit shall be in addition to, not in lieu of, a valid license issued by the State Fire Marshal for the sale of these motors. This permit shall be deemed separate from a local permit allowing the launching of rockets utilizing such motors.*

§1035. Local Permit Required—Launch.

(a) No experimental high power rocket motor user shall launch any experimental high power rocket motor from any site without first securing a permit from the authority having jurisdiction.

(b) The authority having jurisdiction may require notification by the permittee each time an experimental high power rocket motor is to be launched. It shall be the responsibility of the experimental high power rocket motor user to also secure the permission of the owner of private land when such land is intended to be used as a launch site.

§1036. Launching Facilities.

(a) Experimental high power rocket motors shall be launched from platforms meeting the following specifications:

(1) A launch guide (tube, rod, tower or other suitable device) shall be used to restrict the horizontal motion of the rocket until flight velocity sufficient to maintain stability during flight is achieved.

(2) A launch angle of not more than twenty degrees (20o) from the vertical shall be used.

(b) Rocket motor launching shall be by remote electrical means only, and under the supervision and control of an individual properly licensed in accordance with this chapter.

(c) Surface wind at the launch site shall not exceed twenty miles per hour (20 m.p.h.), and visibility above the launching area shall be at least five thousand feet (5,000 ft.).

(d) The recovery device wadding ejected from the rocket during the launch flight sequence, if used, shall be of flame retardant material meeting the standards of Title 19, California Code of Regulations, Chapter 8, Sections 1171 through 1355.

(e) Experimental high power rocket motors shall be launched only during daylight hours unless specifically approved by the authority having jurisdiction.

(f) All personnel, including those conducting the actual launching of the experimental high power rocket motor(s), shall maintain a clear radial distance from the launch platform during the countdown and launch, pursuant to the guidelines in Table 18A.

TABLE 18A—REQUIRED LAUNCH DISTANCES

Total Impulse of Rocket	Radial Distance From launcher
0-320 Newton-Seconds*	30 feet
320.01-1280 Newton-Seconds*	150 feet
1280.01-2560 Newton-Seconds*	200 feet
2560.01-5120 Newton-Seconds*	300 feet
5120.01-10240 Newton-Seconds*	500 feet
10241-20480 Newton-Seconds*	1000 feet

**Rockets propelled by clusters of motors shall use the distance specified for the next higher impulse category.*

§1037. Launch Site Standards.

(a) The launch site shall consist of a launching area and a recovery area. The launching area shall consist of an area surrounding the launching devices a radial distance from the launching device as specified in Table 18A above. The recovery area shall consist of the launching area and the minimum area necessary to retrieve the rocket, based on the estimated altitude likely to be achieved by the rocket. These calculations shall take into account the weight of the rocket and the specific type of motor used (or combined total impulse). Table 18B shall be used to determine the minimum launch site dimensions for the various classes of experimental high power rockets.

(b) The launch site shall not be located in any grain field, dry grass, brush- or forest-covered lands.

(c) The launch site shall not contain any buildings or structures, unless specifically approved in advance by the authority having jurisdiction, and under no circumstances shall such buildings or structures be less than one thousand five hundred feet (1,500 ft.) from the launch site.

(d) The launch site shall not contain any high voltage electrical lines or major highways.

(e) The launch site shall not contain any natural or artificially constructed obstacle deemed by the authority having jurisdiction to pose a hazard during launching.

(f) The launching area shall be located as near as possible to the center of the launch site but in no case less than seven hundred fifty feet (750 ft.) from the boundary of the launch site.

(g) The launching area shall have appropriate barriers around it such that spectators will be restrained from encroaching upon it. These barriers may be of any type approved by the authority having jurisdiction.

TABLE 18B—MINIMUM EXPERIMENTAL HIGH POWER ROCKET MOTOR LAUNCH SITE STANDARDS

Maximum Combined Equivalent Motor Type	Minimum Launch Total Impulse	Site Dimensions (feet)
H	320	1,500
I	640	2,500
J	1,280	3,500
K	2,560	5,000
L	5,120	7,000
M	10,240	10,000
N	20,480	15,000

§1038. Testing. *At locations approved by the authority having jurisdiction, experimental high power rocket motors may be ignited on the ground for the purpose of determining their performance. All of the following procedures shall be followed during the firing of these motors:*

(a) The experimental high power rocket motor shall be affixed to a testing device or to an immovable structure in such a manner that the motor will not work itself free during the testing or the experimentation process.

(b) The experimental high power rocket motor shall be ignited only by remotely operated electrical means fully under the control and supervision of the licensed pyrotechnic operator conducting the testing or experimentation.

(c) The exhaust path of the motor shall be cleared of all flammable objects prior to its firing.

(d) All persons, whether they are conducting, participating in or observing the testing or experiment, shall stand away from the motor, and particularly its exhaust path, at all times during the test or experiment.

(e) Under no circumstances shall testing or experimentation of experimental high power rocket motors be conducted indoors.

§1039. Supervision and Responsibility. *The licensed pyrotechnic operator in charge of the launch site or test sites shall supervise the arming of every experimental high power rocket motor, the launching of all motors, and the disposal of all unwanted or defective motors. The licensed pyrotechnic operator shall also be responsible for the safety of all spectators or observers and all other persons connected with the launching of experimental high power rocket motors.*

SECTION 5613 —EMERGENCY SIGNALING DEVICES

[California Code of Regulations, Title 19, Division 1, §1045-1046]

Article 19. Emergency Signaling Devices

§1045. Fire Hazard. *Whenever the authority having jurisdiction declares that the use of an emergency signaling device would create a fire hazard, no emergency signaling device shall be used regardless of its indicated registration and labeling. This prohibition shall continue as long as the fire hazard condition exists in the specific area, as determined by the authority having jurisdiction.*

§1046. License Required. *Manufacturers of emergency signaling devices whose manufacturing operations take place in California must possess a valid fireworks manufacturing license from the State Fire Marshal to manufacture emergency signaling devices.*

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 57 – FLAMMABLE AND COMBUSTIBLE LIQUIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
[T-19 §3.15]				X																			
5702			X																				
5703.4.1			X																				
5703.6.2			X																				
5703.6.2.2			X																				
5704.2			X																				
5704.2.1			X																				
5704.2.7.4			X																				
5706.5.1.11			X																				
5707			†																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

57

FLAMMABLE AND COMBUSTIBLE LIQUIDS

User notes:

About this chapter: Chapter 57 provides requirements that are intended to reduce the likelihood of fires involving the storage, handling, use or transportation of flammable and combustible liquids. Adherence to these practices may also limit damage in the event of an accidental fire involving these materials. These liquids are used for fuel, lubricants, cleaners, solvents, medicine and even drinking. The danger associated with flammable and combustible liquids is that the vapors from these liquids, when combined with air in their flammable range, will burn or explode at temperatures near normal living and working environments. The regulations herein are intended to prevent the flammable and combustible liquids from being ignited and provide mitigating requirements for when a fire does occur.

SECTION 5701—GENERAL

5701.1 Scope and application. Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of flammable and combustible liquids shall be in accordance with Chapter 50 and this chapter.

[California Code of Regulations, Title 19, Division 1, §3.15] Flammable and Combustible Liquids.

Flammable and combustible liquids shall not be placed, stored or handled in any occupancy within the scope of California Code of Regulations, Title 19, Division 1 regulations, except as provided in the California Fire Code.

5701.2 Nonapplicability. This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 23.
2. Medicines, foodstuffs, cosmetics and commercial or institutional products containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, provided that such materials are packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Quantities of alcoholic beverages in retail or wholesale sales or storage occupancies, provided that the liquids are packaged in individual containers not exceeding 1.3 gallons (5 L).
4. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 605. For abandonment of fuel oil tanks, this chapter applies.
5. Refrigeration systems (see Section 608).
6. Storage and display of aerosol products complying with Chapter 51.
7. Storage and use of liquids that do not have a fire point when tested in accordance with ASTM D92.
8. Liquids with a flash point greater than 95°F (35°C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
9. Liquids without flash points that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
10. The storage of beer, distilled spirits and wines in barrels and casks.
11. Commercial cooking oil storage tank systems located within a building and designed and installed in accordance with Section 607 and NFPA 30.
12. Application and release of pesticide and agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications where applied in accordance with the manufacturer's instructions and label directions.
13. The off-site transportation of flammable or combustible liquids where in accordance with Department of Transportation (DOTn) regulation.

5701.3 Referenced documents. The applicable requirements of Chapter 50, other chapters of this code, the *California Building Code* and the *California Mechanical Code* pertaining to flammable liquids shall apply.

5701.4 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

5701.5 Material classification. Flammable and combustible liquids shall be classified in accordance with the definitions in Chapter 2.

When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual flash point of the mixed liquid shall apply.

When heated above their flash points, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for flammable liquids shall apply.

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SECTION 5702—DEFINITIONS

5702.1 Definitions. The following terms are defined in Chapter 2:

ALCOHOL-BASED HAND RUB.

BULK PLANT OR TERMINAL.

BULK TRANSFER.

COMBUSTIBLE LIQUID.

Class II.

Class IIIA.

Class IIIB.

FIRE POINT.

FLAMMABLE LIQUID.

Class IA.

Class IB.

Class IC.

FLASH POINT.

FUEL LIMIT SWITCH.

LIQUID STORAGE ROOM.

LIQUID STORAGE WAREHOUSE.

MOBILE FUELING.

PROCESS TRANSFER.

REFINERY.

REMOTE EMERGENCY SHUTOFF DEVICE.

REMOTE SOLVENT RESERVOIR.

SOLVENT DISTILLATION UNIT.

TANK, PRIMARY.

TANK IN AN UNDERGROUND AREA.

SECTION 5703—GENERAL REQUIREMENTS

5703.1 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with Section 603 and *the California Electrical Code.*

5703.1.1 Classified locations for flammable liquids. Areas where flammable liquids are stored, handled, dispensed or mixed shall be in accordance with Table 5703.1.1. A classified area shall not extend beyond an unpierced floor, roof or other solid partition.

The extent of the classified area is allowed to be reduced, or eliminated, where sufficient technical justification is provided to the fire code official that a concentration in the area in excess of 25 percent of the lower flammable limit (LFL) cannot be generated.

TABLE 5703.1.1—CLASS I ELECTRICAL EQUIPMENT LOCATIONS[a]

LOCATION	GROUP D DIVISION	EXTENT OF CLASSIFIED AREA
Underground tank fill opening	1	Pits, boxes or spaces below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose-fill connection and within a horizontal radius of 5 feet from a tight-fill connection.
Vent—Discharging upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
Drum and container filling		
Outdoor or indoor with adequate ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent of fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.

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TABLE 5703.1.1—CLASS I ELECTRICAL EQUIPMENT LOCATIONS[a]—continued		
LOCATION	**GROUP D DIVISION**	**EXTENT OF CLASSIFIED AREA**
Pumps, bleeders, withdrawal fittings, meters and similar devices		
Indoor	2	Within 5 feet of any edge of such devices, extending in all directions, and up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoor	2	Within 3 feet of any edge of such devices, extending in all directions, and up to 18 inches above floor or grade level within 10 feet horizontally from an edge of such devices.
Pits		
Without mechanical ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With mechanical ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing valves, fittings or piping, and not within a Division 1 or 2 classified area	2	Entire pit.
Drainage ditches, separators, impounding basins		
Indoor	1 or 2	Same as pits.
Outdoor	2	Area up to 18 inches above ditch, separator or basin, and up to 18 inches above grade within 15 feet horizontal from any edge.
Loading through open dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 15 feet from edge of dome, extending in all directions.
Loading through bottom connections with atmospheric venting	1	Within 3 feet of point of venting to atmosphere, extending in all directions.
	2	Area between 3 feet and 15 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Loading through closed dome with atmospheric venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 15 feet from open end of vent, extending in all directions, and within 3 feet of edge of dome, extending in all directions.
Loading through closed dome with vapor control	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.
Bottom loading with vapor control or any bottom unloading	2	Within 3 feet of point of connection, extending in all directions, and up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.
Storage and repair garage for tank vehicles	1	Pits or spaces below floor level.
	2	Area up to 18 inches above floor or grade level for entire storage or repair garage.
Garages for other than tank vehicles	Ordinary	Where there is an opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening.
Outdoor drum storage	Ordinary	—
Indoor warehousing where there is no flammable liquid transfer	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
Indoor equipment where flammable vapor/air mixtures could exist under normal operations	1	Area within 5 feet of any edge of such equipment, extending in all directions.
	2	Area within 5 feet of any edge of such equipment, extending in all directions. Area between 5 feet and 8 feet of any edge of such equipment, extending in all directions, and the area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.[c]
Outdoor equipment where flammable vapor/air mixtures could exist under normal operations	1	Area within 3 feet of any edge of such equipment, extending in all directions.
	2	Area between 3 feet and 8 feet of any edge of such equipment extending in all directions, and the area up to 3 feet above floor or grade level within 3 feet to 10 feet horizontally from any edge of such equipment.

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TABLE 5703.1.1—CLASS I ELECTRICAL EQUIPMENT LOCATIONS[a]—continued		
LOCATION	**GROUP D DIVISION**	**EXTENT OF CLASSIFIED AREA**
Tank—Above ground		
Shell, ends or roof and dike area	1	Area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference.
	2	Area within 10 feet from shell, ends or roof of tank. Area inside dikes to level of top of dike.
Vent	1	Area within 5 feet of open end of vent, extending in all directions.
	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating roof	1	Area above the roof and within the shell.
Office and restrooms	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified location, the room shall be classified the same as if the wall, curb or partition did not exist.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Locations as classified in *the California Electrical Code.*

b. When classifying extent of area, consideration shall be given to the fact that tank cars or tank vehicles can be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used.

c. The release of Class I liquids can generate vapors to the extent that the entire building, and possibly a zone surrounding it, are considered a Class I, Division 2, location.

5703.1.2 Classified locations for combustible liquids. Areas where Class II or III liquids are heated above their flash points shall have electrical installations in accordance with Section 5703.1.1.

Exception: Solvent distillation units in accordance with Section 5705.4.

5703.1.3 Other applications. The fire code official is authorized to determine the extent of the Class I electrical equipment and wiring location where a condition is not specifically covered by these requirements or *the California Electrical Code.*

5703.2 Fire protection. Fire protection for the storage, use, dispensing, mixing, handling and on-site transportation of flammable and combustible liquids shall be in accordance with this chapter and applicable sections of Chapter 9.

5703.2.1 Portable fire extinguishers and hose lines. Portable fire extinguishers shall be provided in accordance with Section 906. Hose lines shall be provided in accordance with Section 905.

5703.3 Site assessment. In the event of a spill, leak or discharge from a tank system, a site assessment shall be completed by the owner or operator of such tank system if the fire code official determines that a potential fire or explosion hazard exists. Such site assessments shall be conducted to ascertain potential fire hazards and shall be completed and submitted to the fire department within a time period established by the fire code official, not to exceed 60 days.

5703.4 Spill control and secondary containment. Where the maximum allowable quantity per control area is exceeded, and where required by Section 5004.2, rooms, buildings or areas used for storage, dispensing, use, mixing or handling of Class I, II and IIIA liquids shall be provided with spill control and secondary containment in accordance with Section 5004.2.

5703.4.1 Spill control and secondary containment for tanks in underground areas. *Tanks in underground areas and associated piping systems shall be provided with spill control and secondary containment that are designed and constructed as outlined in Section 5004.2, except as modified by Section 5703.6.2.2.*

5703.5 Labeling and signage. The fire code official is authorized to require warning signs for the purpose of identifying the hazards of storing or using flammable liquids. Signage for identification and warning such as for the inherent hazard of flammable liquids or smoking shall be provided in accordance with this chapter and Sections 5003.5 and 5003.6.

5703.5.1 Style. Warning signs shall be of a durable material. Signs warning of the hazard of flammable liquids shall have white lettering on a red background and shall read: "DANGER—FLAMMABLE LIQUIDS." Letters shall be not less than 3 inches (76 mm) in height and $^1/_2$ inch (12.7 mm) in stroke.

5703.5.2 Location. Signs shall be posted in locations as required by the fire code official. Piping containing flammable liquids shall be identified in accordance with ASME A13.1.

5703.5.3 Warning labels. Individual containers, packages and cartons shall be identified, marked, labeled and placarded in accordance with federal regulations and applicable state laws.

5703.5.4 Identification. Color coding or other approved identification means shall be provided on each loading and unloading riser for flammable or combustible liquids to identify the contents of the tank served by the riser.

5703.6 Piping systems. Piping systems, and their component parts, for flammable and combustible liquids shall be in accordance with Sections 5703.6.1 through 5703.6.11.

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5703.6.1 Nonapplicability. The provisions of Section 5703.6 shall not apply to gas or oil well installations; piping that is integral to stationary or portable engines, including aircraft, watercraft and motor vehicles; and piping in connection with boilers and pressure vessels regulated by the *California Mechanical Code*.

5703.6.2 Design and fabrication of piping systems and components. Piping system components shall be designed and fabricated in accordance with the applicable standard listed in Table 5703.6.2 and Chapter 27 of NFPA 30, except as modified by Section*s* 5703.6.2.1 *and 5703.6.2.2.*

TABLE 5703.6.2—PIPING STANDARDS

PIPING USE	STANDARD
Power piping	ASME B31.1
Process piping	ASME B31.3
Pipeline transportation systems for liquid hydrocarbons and other liquids	ASME B31.4
Building services piping	ASME B31.9
Double containment piping	UL 971A, UL 1369

5703.6.2.1 Special materials. Low-melting-point materials (such as aluminum, copper or brass), materials that soften on fire exposure (such as nonmetallic materials) and nonductile material (such as cast iron) shall be acceptable for use underground in accordance with the applicable standard listed in Table 5703.6.2. Where such materials are used outdoors in above-ground piping systems or within buildings, they shall be in accordance with the applicable standard listed in Table 5703.6.2 and one of the following:

1. Suitably protected against fire exposure.
2. Located where leakage from failure would not unduly expose people or structures.
3. Located where leakage can be readily controlled by operation of remotely located valves in a location provided with ready access.

In all cases, nonmetallic piping shall be used in accordance with Section 27.4.6 of NFPA 30.

5703.6.2.2 Below-grade or underground piping systems connected to a tank in an underground area. *Below-grade or underground piping systems that are connected to a tank in an underground area shall have secondary containment. The building, room or area in which the flammable or combustible liquid is stored or located may be used as secondary containment if it meets the containment and drainage methods as described in Section 5004.2.2.1.*

All portions of below-grade and underground piping systems shall be monitored for leaks by one of the following methods:

1. *A listed or approved leak detection system that either activates an audible and visual alarm or stops the flow of product when a leak is detected.*
2. *Direct visual inspection conducted monthly by designated personnel.*
3. *Indirect visual inspection conducted monthly through the use of, but not limited to, mirrors, cameras or video equipment.*
4. *If the above methods cannot be met, an alternative means shall be provided in accordance with Section 1.11.2.4.*

Exceptions:

1. *Piping systems connected to a tank in an underground area that is used solely in connection with a fire pump or emergency system, legally required standby system or optional standby system as specified in Health and Safety Code Section 25270.2(o)(1)(C)(iii).*
2. *Piping systems connected to a tank in an underground area that contains petroleum to be used or previously used as a lubricant or coolant in a motor engine or transmission or oil-filled operational equipment or oil-filled manufacturing equipment, as described in Health and Safety Code Section 25270.2(o)(1)(C)(i).*
3. *Piping systems connected to a petroleum hazardous waste tank in an underground area that complies with the hazardous waste tank standards pursuant to the California Code of Regulations, Title 22, Chapter 15, Article 10 (commencing with Section 66265.190), and the facility has been issued a unified program facility permit pursuant to Health and Safety Code Section 25404.2 for generation, treatment, accumulation or storage of hazardous waste, as described in Health and Safety Code Section 25270.2(o)(1) (C)(ii).*

5703.6.3 Testing. Unless tested in accordance with the applicable section of ASME B31.9, piping, before being covered, enclosed or placed in use, shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gauge (psig) (34.47 kPa) at the highest point of the system. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For not less than 10 minutes, there shall be no leakage or permanent distortion. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.

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5703.6.3.1 Existing piping. Existing piping shall be tested in accordance with this section where the fire code official has reasonable cause to believe that a leak exists. Piping that could contain flammable or combustible liquids shall not be tested pneumatically. Such tests shall be at the expense of the owner or operator.

Exception: Vapor-recovery piping is allowed to be tested using an inert gas.

5703.6.4 Protection from vehicles. Guard posts or other approved means shall be provided to protect piping, valves or fittings subject to vehicular damage in accordance with Section 312.

5703.6.5 Protection from external corrosion and galvanic action. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and above-ground applications shall be fabricated from noncorrosive materials, and coated or provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined.

5703.6.6 Valves. Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the plant under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure.

5703.6.6.1 Backflow protections. Connections to pipelines or piping by which equipment (such as tank cars, tank vehicles or marine vessels) discharges liquids into storage tanks shall be provided with check valves or block valves for automatic protection against backflow where the piping arrangement is such that backflow from the system is possible. Where loading and unloading is done through a common pipe system, a check valve is not required. However, a block valve, located in an area where it is provided with ready access or remotely operable, shall be provided.

5703.6.6.2 Manual drainage. Manual drainage-control valves shall be located at approved locations remote from the tanks, diked area, drainage system and impounding basin to ensure their operation in a fire condition.

5703.6.7 Connections. Above-ground tanks with connections located below normal liquid level shall be provided with internal or external isolation valves located as close as practical to the shell of the tank. Except for liquids whose chemical characteristics are incompatible with steel, such valves, where external, and their connections to the tank shall be of steel.

5703.6.8 Piping supports. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, contraction or exposure to fire. The supports shall be protected against exposure to fire by one of the following:

1. Draining liquid away from the piping system at a minimum slope of not less than 1 percent.
2. Providing protection with a fire-resistance rating of not less than 2 hours.
3. Other approved methods.

5703.6.9 Flexible joints. Flexible joints shall be listed and approved and shall be installed on underground liquid, vapor and vent piping at all of the following locations:

1. Where piping connects to underground tanks.
2. Where piping ends at pump islands and vent risers.
3. At points where differential movement in the piping can occur.

5703.6.9.1 Fiberglass-reinforced plastic piping. Fiberglass-reinforced plastic (FRP) piping is not required to be provided with flexible joints in locations where both of the following conditions are present:

1. Piping does not exceed 4 inches (102 mm) in diameter.
2. Piping has a straight run of not less than 4 feet (1219 mm) on one side of the connection where such connections result in a change of direction.

In lieu of the minimum 4-foot (1219 mm) straight run length, approved and listed flexible joints are allowed to be used under dispensers and suction pumps, at submerged pumps and tanks, and where vents extend above ground.

5703.6.10 Pipe joints. Joints shall be liquid tight and shall be welded, flanged or threaded except that listed flexible connectors are allowed in accordance with Section 5703.6.9. Threaded or flanged joints shall fit tightly by using approved methods and materials for the type of joint. Joints in piping systems used for Class I liquids shall be welded where located in concealed spaces within buildings.

Nonmetallic joints shall be approved and shall be installed in accordance with the manufacturer's instructions.

Pipe joints that are dependent on the friction characteristics or resiliency of combustible materials for liquid tightness of piping shall not be used in buildings. Piping shall be secured to prevent disengagement at the fitting.

5703.6.11 Bends. Pipe and tubing shall be bent in accordance with ASME B31.9.

SECTION 5704—STORAGE

5704.1 General. The storage of flammable and combustible liquids in containers and tanks shall be in accordance with this section and the applicable sections of Chapter 50.

5704.2 Tank storage. The provisions of this section shall apply to:

1. The storage of flammable and combustible liquids in fixed above-ground and underground tanks.

Exception: *Tanks connected to building heating systems installed in accordance with Section 605.4.*

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2. The storage of flammable and combustible liquids in fixed above-ground tanks inside of buildings.

   Exception: *Tanks connected to building heating systems installed in accordance with Section 605.4.*

3. The storage of flammable and combustible liquids in portable tanks whose capacity exceeds 660 gallons (2498 L).
4. The installation of such tanks and portable tanks.

5704.2.1 Change of tank contents. Tanks subject to change in contents shall be in accordance with Section 5704.2.7. Prior to a change in contents, the fire code official is authorized to require testing of a tank.

Tanks that have previously contained Class I liquids shall not be loaded with Class II or Class III liquids until such tanks and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

Exception: *When approved by the Enforcing Agency, the procedures prescribed in API (API-RP-2003) Recommended Practices 2003, entitled: "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents," may be used for changing tank contents.*

5704.2.2 Use of tank vehicles and tank cars as storage tanks. Tank cars and tank vehicles shall not be used as storage tanks.

5704.2.3 Labeling and signs. Labeling and signs for storage tanks and storage tank areas shall comply with Sections 5704.2.3.1 and 5704.2.3.2.

5704.2.3.1 Smoking and open flame. Signs shall be posted in storage areas prohibiting open flames and smoking. Signs shall comply with Section 5703.5.

5704.2.3.2 Label or placard. Tanks more than 100 gallons (379 L) in capacity, which are permanently installed or mounted and used for the storage of Class I, II or III liquids, shall bear a label and placard identifying the material therein. Placards shall be in accordance with NFPA 704.

Exceptions:

1. Tanks of 300-gallon (1136 L) capacity or less located on private property and used for heating and cooking fuels in single-family dwellings.
2. Tanks located underground.

5704.2.4 Sources of ignition. Smoking and open flames are prohibited in storage areas in accordance with Section 5003.7.

Exception: Areas designated as smoking and hot work areas, and areas where hot work permits have been issued in accordance with this code.

5704.2.5 Explosion control. Explosion control shall be provided in accordance with Section 911 for indoor tanks.

5704.2.6 Separation from incompatible materials. Storage of flammable and combustible liquids shall be separated from incompatible materials in accordance with Section 5003.9.8.

Grass, weeds, combustible materials and waste Class I, II or IIIA liquids shall not be accumulated in an unsafe manner at a storage site.

5704.2.7 Design, fabrication and construction requirements for tanks. The design, fabrication and construction of tanks shall comply with NFPA 30. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.

5704.2.7.1 Materials used in tank construction. The materials used in tank construction shall be in accordance with NFPA 30. The materials of construction for tanks and their appurtenances shall be compatible with the liquids to be stored.

5704.2.7.2 Pressure limitations for tanks. Tanks shall be designed for the pressures to which they will be subjected in accordance with NFPA 30.

5704.2.7.3 Tank vents for normal venting. Tank vents for normal venting shall be installed and maintained in accordance with Sections 5704.2.7.3.1 through 5704.2.7.3.5.3.

5704.2.7.3.1 Vent lines. Vent lines from tanks shall not be used for purposes other than venting unless approved.

5704.2.7.3.2 Vent-line flame arresters and pressure-vacuum vents. Listed or approved flame arresters or pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids.

Vent-line flame arresters shall be installed in accordance with their listing or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000. In-line flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028. Pressure-vacuum vents shall be installed in accordance with Section 21.4.3 of NFPA 30 or API 2000 and maintained in accordance with Section 21.8.6 of NFPA 30 or API 2000.

Exception: Where determined by the fire code official that the use of these devices can result in damage to the tank.

5704.2.7.3.3 Vent pipe outlets. Vent pipe outlets for tanks storing Class I, II or IIIA liquids shall be located such that the vapors are released at a safe point outside of buildings and not less than 12 feet (3658 mm) above the finished ground level. Vapors shall be discharged upward or horizontally away from adjacent walls to assist in vapor dispersion. Vent outlets shall be located such that flammable vapors will not be trapped by eaves or other obstructions and shall be not less than 5 feet (1524 mm) from building openings or lot lines of properties that can be built on. Vent outlets on atmospheric tanks storing Class IIIB liquids are allowed to discharge inside a building where the vent is a normally closed vent.

Exception: Vent pipe outlets on tanks storing Class IIIB liquid inside buildings and connected to fuel-burning equipment shall be located such that the vapors are released to a safe location outside of buildings.

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5704.2.7.3.4 Installation of vent piping. Vent piping shall be designed, sized, constructed and installed in accordance with Section 5703.6. Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be installed in such a manner so as not to be subject to physical damage or vibration.

5704.2.7.3.5 Manifolding. Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.

5704.2.7.3.5.1 Above-ground tanks. For above-ground tanks, manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded where manifolded tanks are subject to the same fire exposure.

5704.2.7.3.5.2 Underground tanks. For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously.

5704.2.7.3.5.3 Tanks storing Class I liquids. Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II and III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II and III liquids, to prevent contamination and possible change in classification of less volatile liquid.

5704.2.7.4 Emergency venting. Stationary, above-ground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents for Class I, II and IIIA liquids shall not discharge inside buildings. The venting shall be installed and maintained in accordance with Section 22.7 of NFPA 30 *except as modified by Section 5703.6.2.2.*

Exceptions:

1. Tanks larger than 12,000 gallons (45 420 L) in capacity storing Class IIIB liquids that are not within the diked area or the drainage path of Class I or II liquids do not require emergency relief venting.
2. Emergency vents on protected above-ground tanks complying with UL 2085 containing Class II or IIIA liquids are allowed to discharge inside the building.

5704.2.7.5 Tank openings other than vents. Tank openings for other than vents shall comply with Sections 5704.2.7.5.1 through 5704.2.7.5.8.

5704.2.7.5.1 Connections below liquid level. Connections for tank openings below the liquid level shall be liquid tight.

5704.2.7.5.2 Filling, emptying and vapor recovery connections. Filling, emptying and vapor recovery connections to tanks containing Class I, II or IIIA liquids shall be located outside of buildings in accordance with Section 5704.2.7.5.6 at a location free from sources of ignition and not less than 5 feet (1524 mm) away from building openings or lot lines of property that can be built on. Such openings shall be properly identified and provided with a liquid-tight cap that shall be closed when not in use.

Filling and emptying connections to indoor tanks containing Class IIIB liquids and connected to fuel-burning equipment shall be located at a finished ground level location outside of buildings. Such openings shall be provided with a liquid-tight cap that shall be closed when not in use. A sign in accordance with Section 5003.6 that displays the following warning shall be permanently attached at the filling location:

TRANSFERRING FUEL OTHER THAN
CLASS IIIB COMBUSTIBLE LIQUID TO
THIS TANK CONNECTION IS A VIOLATION
OF THE FIRE CODE AND IS STRICTLY
PROHIBITED

5704.2.7.5.3 Piping, connections and fittings. Piping, connections, fittings and other appurtenances shall be installed in accordance with Section 5703.6.

5704.2.7.5.4 Manual gauging. Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. If inside a building, such openings shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other approved device.

5704.2.7.5.5 Fill pipes and discharge lines. For top-loaded tanks, a metallic fill pipe shall be designed and installed to minimize the generation of static electricity by terminating the pipe within 6 inches (152 mm) of the bottom of the tank, and it shall be installed in a manner that avoids excessive vibration.

5704.2.7.5.5.1 Class I liquids. For Class I liquids other than crude oil, gasoline and asphalt, the fill pipe shall be designed and installed in a manner that will minimize the possibility of generating static electricity by terminating within 6 inches (152 mm) of the bottom of the tank.

5704.2.7.5.5.2 Underground tanks. For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids having a capacity greater than 1,000 gallons (3785 L) shall be equipped with a tight fill device for connecting the fill hose to the tank.

5704.2.7.5.6 Location of connections that are made or broken. Filling, withdrawal and vapor-recovery connections for Class I, II and IIIA liquids that are made and broken shall be located outside of buildings, not more than 5 feet (1524 mm) above the finished ground level, in an approved location in close proximity to the parked delivery vehicle. Such location shall be away from sources of ignition and not less than 5 feet (1524 mm) away from building openings. Such connections shall be closed and liquid tight when not in use and shall be properly identified.

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5704.2.7.5.7 Protection against vapor release. Tank openings provided for purposes of vapor recovery shall be protected against possible vapor release by means of a spring-loaded check valve or dry-break connections, or other approved device, unless the opening is a pipe connected to a vapor processing system. Openings designed for combined fill and vapor recovery shall be protected against vapor release unless connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line. Connections shall be vapor tight.

5704.2.7.5.8 Overfill prevention. An approved means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfill of all Class I, II and IIIA liquid storage tanks. Storage tanks in refineries, bulk plants or terminals regulated by Section 5706.4 or 5706.7 shall have overfill protection in accordance with API 2350.

An approved means or method in accordance with Section 5704.2.9.7.5 shall be provided to prevent the overfilling of Class IIIB liquid storage tanks connected to fuel-burning equipment inside buildings.

Exception: Outside above-ground tanks with a capacity of 1,320 gallons (5000 L) or less.

5704.2.7.6 Repair, alteration or reconstruction of tanks and piping. The repair, alteration or reconstruction, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30. Hot work, as defined in Section 202, on such tanks shall be conducted in accordance with Section 3510.

5704.2.7.7 Design of supports. The design of the supporting structure for tanks shall be in accordance with the *California Building Code* and NFPA 30.

5704.2.7.8 Locations subject to flooding. Where a tank is located in an area where it is subject to buoyancy because of a rise in the water table, flooding or accumulation of water from fire suppression operations, uplift protection shall be provided in accordance with Sections 22.14 and 23.14 of NFPA 30.

5704.2.7.9 Corrosion protection. Where subject to external corrosion, tanks shall be fabricated from corrosion-resistant materials, coated or provided with corrosion protection in accordance with Section 23.3.5 of NFPA 30.

5704.2.7.10 Leak reporting. A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the fire department, the fire code official and other authorities having jurisdiction.

5704.2.7.10.1 Leaking tank disposition. Leaking tanks shall be promptly emptied, repaired and returned to service, abandoned or removed in accordance with Section 5704.2.13 or 5704.2.14.

5704.2.7.11 Tank lining. Steel tanks are allowed to be lined only for the purpose of protecting the interior from corrosion or providing compatibility with a material to be stored. Only those liquids tested for compatibility with the lining material are allowed to be stored in lined tanks.

5704.2.8 Vaults. Vaults shall be allowed to be either above or below grade and shall comply with Sections 5704.2.8.1 through 5704.2.8.18.

5704.2.8.1 Listing required. Vaults shall be listed in accordance with UL 2245.

Exception: Where approved by the fire code official, below-grade vaults are allowed to be constructed on site, provided that the design is in accordance with the *California Building Code* and that special inspections are conducted to verify structural strength and compliance of the installation with the approved design in accordance with Section 1707 of the *California Building Code*. Installation plans for below-grade vaults that are constructed on site shall be prepared by, and the design shall bear the stamp of, a professional engineer. Consideration shall be given to soil and hydrostatic loading on the floors, walls and lid; anticipated seismic forces; uplifting by groundwater or flooding; and to loads imposed from above such as traffic and equipment loading on the vault lid.

5704.2.8.2 Design and construction. The vault shall completely enclose each tank. There shall not be openings in the vault enclosure except those necessary for access to, inspection of, and filling, emptying and venting of the tank. The walls and floor of the vault shall be constructed of reinforced concrete not less than 6 inches (152 mm) thick. The top of an above-grade vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault, to ensure that the thrust of an explosion occurring inside the vault is directed upward before significantly high pressure can develop within the vault.

The top of an at-grade or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault. The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. The walls and floor of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading.

Vaults shall be designed to be wind and earthquake resistant, in accordance with the *California Building Code*.

5704.2.8.3 Secondary containment. Vaults shall be substantially liquid tight and there shall not be backfill around the tank or within the vault. The vault floor shall drain to a sump. For premanufactured vaults, liquid tightness shall be certified as part of the listing provided by a nationally recognized testing laboratory. For field-erected vaults, liquid tightness shall be certified in an approved manner.

5704.2.8.4 Internal clearance. There shall be sufficient clearance between the tank and the vault to allow for visual inspection and maintenance of the tank and its appurtenances. Dispensing devices are allowed to be installed on tops of vaults.

5704.2.8.5 Anchoring. Vaults and their tanks shall be suitably anchored to withstand uplifting by ground water or flooding, including when the tank is empty.

5704.2.8.6 Vehicle impact protection. Vaults shall be resistant to damage from the impact of a motor vehicle, or vehicle impact protection shall be provided in accordance with Section 312.

5704.2.8.7 Arrangement. Tanks shall be listed for above-ground use, and each tank shall be in its own vault. Compartmentalized tanks shall be allowed and shall be considered as a single tank. Adjacent vaults shall be allowed to share a common wall. The common wall shall be liquid and vapor tight and shall be designed to withstand the load imposed when the vault on either side of the wall is filled with water.

5704.2.8.8 Connections. Connections shall be provided to permit venting of each vault to dilute, disperse and remove vapors prior to personnel entering the vault.

5704.2.8.9 Ventilation. Vaults that contain tanks of Class I liquids shall be provided with an exhaust ventilation system installed in accordance with Section 5004.3. The ventilation system shall operate continuously or be designed to operate upon activation of the vapor or liquid detection system. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot of floor area [0.00508 $m^3/(s \times m^2)$], but not less than 150 cfm (4 m^3/min). The exhaust system shall be designed to provide air movement across all parts of the vault floor. Supply and exhaust ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm), of the floor. The exhaust system shall be installed in accordance with the *California Mechanical Code*.

5704.2.8.10 Liquid detection. Vaults shall be equipped with a detection system capable of detecting liquids, including water, and activating an alarm.

5704.2.8.11 Monitoring and detection. Vaults shall be provided with approved vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup. Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) of the liquid stored. Vapor detectors shall be located not higher than 12 inches (305 mm) above the lowest point in the vault. Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturer's instructions. Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an approved, constantly attended location within the facility serving the tanks or at an approved location. Activation of vapor detection systems shall shut off dispenser pumps.

5704.2.8.12 Liquid removal. Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, the pump shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1, or Zone 0 locations, as defined in *the California Electrical Code.*

5704.2.8.13 Normal vents. Vent pipes that are provided for normal tank venting shall terminate not less than 12 feet (3658 mm) above ground level.

5704.2.8.14 Emergency vents. Emergency vents shall be vapor tight and shall be allowed to discharge inside the vault. Longbolt manhole covers shall not be allowed for this purpose.

5704.2.8.15 Accessway. Vaults shall be provided with an approved personnel accessway with a minimum dimension of 30 inches (762 mm) and with a permanently affixed, nonferrous ladder. Accessways shall be designed to be nonsparking. Travel distance from any point inside a vault to an accessway shall not exceed 20 feet (6096 mm). At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Entry points shall be secured against unauthorized entry and vandalism.

5704.2.8.16 Fire protection. Vaults shall be provided with a suitable means to admit a fire suppression agent.

5704.2.8.17 Classified area. The interior of a vault containing a tank that stores a Class I liquid shall be designated a Class I, Division 1, or Zone 0 location, as defined in *the California Electrical Code.*

5704.2.8.18 Overfill protection. Overfill protection shall be provided in accordance with Section 5704.2.9.7.5. The use of a float vent valve shall be prohibited.

5704.2.9 Above-ground tanks. Above-ground storage of flammable and combustible liquids in tanks shall comply with Section 5704.2 and Sections 5704.2.9.1 through 5704.2.9.7.9.

5704.2.9.1 Existing noncompliant installations. Existing above-ground tanks shall be maintained in accordance with the code requirements that were applicable at the time of installation. Above-ground tanks that were installed in violation of code requirements applicable at the time of installation shall be made code compliant or shall be removed in accordance with Section 5704.2.14, regardless of whether such tank has been previously inspected (see Section 109.4).

5704.2.9.2 Fire protection. Fire protection for above-ground tanks shall comply with Sections 5704.2.9.2.1 through 5704.2.9.2.4.

5704.2.9.2.1 Required foam fire protection systems. Where required by the fire code official, foam fire protection shall be provided for above-ground tanks, other than pressure tanks operating at or above 1 pound per square inch gauge (psig) (6.89 kPa) where such tank, or group of tanks spaced less than 50 feet (15 240 mm) apart measured shell to shell, has a liquid surface area in excess of 1,500 square feet (139 m^2), and is in accordance with one of the following:

1. Used for the storage of Class I or II liquids.
2. Used for the storage of crude oil.
3. Used for in-process products and is located within 100 feet (30 480 mm) of a fired still, heater, related fractioning or processing apparatus or similar device at a processing plant or petroleum refinery as herein defined.
4. Considered by the fire code official as posing an unusual exposure hazard because of topographical conditions; nature of occupancy, proximity on the same or adjoining property, and height and character of liquids to be

stored; degree of private fire protection to be provided; and facilities of the fire department to cope with flammable liquid fires.

5704.2.9.2.2 Foam fire protection system installation. Where foam fire protection is required, it shall be installed in accordance with NFPA 11.

5704.2.9.2.2.1 Foam storage. Where foam fire protection is required, foam-producing materials shall be stored on the premises.

Exception: Storage of foam-producing materials off the premises is allowed as follows:

1. Such materials stored off the premises shall be of the proper type suitable for use with the equipment at the installation where required.
2. Such materials shall be readily available at the storage location at all times.
3. Adequate loading and transportation facilities shall be provided.
4. The time required to deliver such materials to the required location in the event of fire shall be consistent with the hazards and fire scenarios for which the foam supply is intended.
5. At the time of a fire, these off-premises supplies shall be accumulated in sufficient quantities before placing the equipment in operation to ensure foam production at an adequate rate without interruption until extinguishment is accomplished.

5704.2.9.2.3 Fire protection of supports. Supports or pilings for above-ground tanks storing Class I, II or IIIA liquids elevated more than 12 inches (305 mm) above grade shall have a fire-resistance rating of not less than 2 hours in accordance with the fire exposure criteria specified in ASTM E1529.

Exceptions:

1. Structural supports tested as part of a protected above-ground tank in accordance with UL 2085.
2. Stationary tanks located outside of buildings where protected by an approved water-spray system designed in accordance with Chapter 9 and NFPA 15.
3. Stationary tanks located inside of buildings equipped throughout with an approved automatic sprinkler system designed in accordance with Section 903.3.1.1.

5704.2.9.2.4 Inerting of tanks storing boilover liquids. Liquids with boilover characteristics shall not be stored in fixed roof tanks larger than 150 feet (45 720 mm) in diameter unless an approved gas enrichment or inerting system is provided on the tank.

Exception: Crude oil storage tanks in production fields with no other exposures adjacent to the storage tank.

5704.2.9.3 Supports, foundations and anchorage. Supports, foundations and anchorages for above-ground tanks shall be designed and constructed in accordance with NFPA 30 and the *California Building Code*.

5704.2.9.4 Stairways, platforms and walkways. Stairways, platforms and walkways shall be of noncombustible construction and shall be designed and constructed in accordance with NFPA 30 and the *California Building Code*.

5704.2.9.5 Above-ground tanks inside of buildings. Above-ground tanks inside of buildings shall comply with Sections 5704.2.9.5.1 and 5704.2.9.5.2.

5704.2.9.5.1 Overfill prevention. Above-ground tanks storing Class I, II and IIIA liquids inside buildings shall be equipped with a device or other means to prevent overflow into the building including, but not limited to: a float valve; a preset meter on the fill line; a valve actuated by the weight of the tank's contents; a low-head pump that is incapable of producing overflow; or a liquid-tight overflow pipe not less than one pipe size larger than the fill pipe and discharging by gravity back to the outside source of liquid or to an approved location. Tanks containing Class IIIB liquids and connected to fuel-burning equipment shall be provided with a means to prevent overflow into buildings in accordance with Section 5704.2.7.5.8.

5704.2.9.5.2 Fill pipe connections. Fill pipe connections for tanks storing Class I, II and IIIA liquids and Class IIIB liquids connected to fuel-burning equipment shall be in accordance with Section 5704.2.9.7.6.

5704.2.9.6 Above-ground tanks outside of buildings. Above-ground tanks outside of buildings shall comply with Sections 5704.2.9.6.1 through 5704.2.9.6.3.

5704.2.9.6.1 Locations where above-ground tanks are prohibited. Storage of Class I and II liquids in above-ground tanks outside of buildings is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction.

5704.2.9.6.1.1 Location of tanks with pressures 2.5 psig or less. Above-ground tanks operating at pressures not exceeding 2.5 psig (17.2 kPa) for storage of Class I, II or IIIA liquids, which are designed with a floating roof, a weak roof-to-shell seam or equipped with emergency venting devices limiting pressure to 2.5 psig (17.2 kPa), shall be located in accordance with Table 22.4.1.1(a) of NFPA 30.

Exceptions:

1. Vertical tanks having a weak roof-to-shell seam and storing Class IIIA liquids are allowed to be located at one-half the distances specified in Table 22.4.1.1(a) of NFPA 30, provided that the tanks are not within a diked area or drainage path for a tank storing Class I or II liquids.

2. Liquids with boilover characteristics and unstable liquids in accordance with Sections 5704.2.9.6.1.3 and 5704.2.9.6.1.4.
3. For protected above-ground tanks in accordance with Section 5704.2.9.7 and tanks in at-grade or above-grade vaults in accordance with Section 5704.2.8, the distances in Table 22.4.1.1(b) of NFPA 30 shall apply and shall be reduced by one-half, but not to less than 5 feet (1524 mm).

5704.2.9.6.1.2 Location of tanks with pressures exceeding 2.5 psig. Above-ground tanks for the storage of Class I, II or IIIA liquids operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa) shall be located in accordance with Table 22.4.1.3 of NFPA 30.

Exception: Liquids with boilover characteristics and unstable liquids in accordance with Sections 5704.2.9.6.1.3 and 5704.2.9.6.1.4.

5704.2.9.6.1.3 Location of tanks storing boilover liquids. Above-ground tanks for storage of liquids with boilover characteristics shall be located in accordance with Table 2204.1.4.1 of NFPA 30.

5704.2.9.6.1.4 Location of tanks storing unstable liquids. Above-ground tanks for the storage of unstable liquids shall be located in accordance with Table 22.4.1.5 of NFPA 30.

5704.2.9.6.1.5 Location of tanks storing Class IIIB liquids. Above-ground tanks for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with Table 22.1.5 of NFPA 30, except where located within a diked area or drainage path for a tank or tanks storing Class I or II liquids. Where a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or II liquid, distances required by Section 5704.2.9.6.1.1 shall apply.

5704.2.9.6.1.6 Reduction of separation distances to adjacent property. Where two tank properties of diverse ownership have a common boundary, the fire code official is authorized to, with the written consent of the owners of the two properties, apply the distances in Sections 5704.2.9.6.1.2 through 5704.2.9.6.1.5 assuming a single property.

5704.2.9.6.2 Separation between adjacent stable or unstable liquid tanks. The separation between tanks containing stable liquids shall be in accordance with Table 22.4.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the *fire code official* is authorized to require greater separation than specified in Table 22.4.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern open for firefighting purposes.

The separation between tanks containing unstable liquids shall be not less than one-half the sum of their diameters.

Exception: Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

5704.2.9.6.3 Separation between adjacent tanks containing flammable or combustible liquids and LP-gas. The minimum horizontal separation between an LP-gas container and a Class I, II or IIIA liquid storage tank shall be 20 feet (6096 mm) except in the case of Class I, II or IIIA liquid tanks operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa), in which case the provisions of Section 5704.2.9.6.2 shall apply.

An approved means shall be provided to prevent the accumulation of Class I, II or IIIA liquids under adjacent LP-gas containers such as by dikes, diversion curbs or grading. Where flammable or combustible liquid storage tanks are within a diked area, the LP-gas containers shall be outside the diked area and not less than 10 feet (3048 mm) away from the centerline of the wall of the diked area.

Exceptions:

1. Liquefied petroleum gas containers of 125 gallons (473 L) or less in capacity installed adjacent to fuel-oil supply tanks of 660 gallons (2498 L) or less in capacity.
2. Horizontal separation is not required between above-ground LP-gas containers and underground flammable and combustible liquid tanks.

5704.2.9.7 Additional requirements for protected above-ground tanks. In addition to the requirements of this chapter for above-ground tanks, the installation of protected above-ground tanks shall be in accordance with Sections 5704.2.9.7.1 through 5704.2.9.7.9.

5704.2.9.7.1 Tank construction. The construction of a protected above-ground tank and its primary tank shall be in accordance with Section 5704.2.7.

5704.2.9.7.2 Normal and emergency venting. Normal and emergency venting for protected above-ground tanks shall be provided in accordance with Sections 5704.2.7.3 and 5704.2.7.4. The vent capacity reduction factor shall not be allowed.

5704.2.9.7.3 Secondary containment. Protected above-ground tanks shall be provided with secondary containment, drainage control or diking in accordance with Section 5004.2. A means shall be provided to establish the integrity of the secondary containment in accordance with NFPA 30.

5704.2.9.7.4 Vehicle impact protection. Where protected above-ground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the provisions of Section 312, or where necessary, a combination of both. Where guard posts or other approved barriers are provided, they shall be independent of each above-ground tank.

5704.2.9.7.5 Overfill prevention. Protected above-ground tanks shall not be filled in excess of 95 percent of their capacity. An overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall comply with one of the following:

1. The overfill prevention system shall include the following:
    1.1. An independent means of notifying the person filling the tank that the fluid level has reached 90 percent of tank capacity by providing an audible or visual alarm signal, providing a tank level gauge marked at 90 percent of tank capacity, or other approved means.
    1.2. Automatic shut off of the flow of fuel to the tank when the quantity of liquid in the tank reaches 95 percent of tank capacity. For rigid hose fuel-delivery systems, an approved means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated.
2. The system shall reduce the flow rate to not more than 15 gallons per minute (0.95 L/s) so that at the reduced flow rate, the tank will not overfill for 30 minutes, and automatically shut off flow into the tank so that none of the fittings on the top of the tank are exposed to product because of overfilling.

5704.2.9.7.5.1 Information signs. A permanent sign shall be provided at the fill point for the tank, documenting the filling procedure and the tank calibration chart.

Exception: Where climatic conditions are such that the sign has the potential to be obscured by ice or snow, or weathered beyond readability or otherwise impaired, said procedures and chart shall be located in the office window, lock box or other area available to the person filling the tank.

5704.2.9.7.5.2 Determination of available tank capacity. The filling procedure shall require the person filling the tank to determine the gallonage (literage) required to fill it to 90 percent of capacity before commencing the fill operation.

5704.2.9.7.6 Fill pipe connections. The fill pipe shall be provided with a means for making a direct connection to the tank vehicle's fuel delivery hose so that the delivery of fuel is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill hose connection.

5704.2.9.7.7 Spill containers. A spill container having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

5704.2.9.7.8 Tank openings. Tank openings in protected above-ground tanks shall be through the top only.

5704.2.9.7.9 Antisiphon devices. Approved antisiphon devices shall be installed in each external pipe connected to the protected above-ground tank where the pipe extends below the level of the top of the tank.

5704.2.10 Drainage and diking. The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways.

Exceptions:

1. The fire code official is authorized to alter or waive these requirements based on a technical report that demonstrates that such tank or group of tanks does not constitute a hazard to other tanks, waterways or adjoining property, after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings on the same or adjacent property, capacity, and construction of proposed tanks and character of liquids to be stored, and nature and quantity of private and public fire protection provided.
2. Drainage control and diking is not required for listed secondary containment tanks.

5704.2.10.1 Volumetric capacity. The volumetric capacity of the diked area shall be not less than the greatest amount of liquid that can be released from the largest tank within the diked area. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

5704.2.10.2 Diked areas containing two or more tanks. Diked areas containing two or more tanks shall be subdivided in accordance with NFPA 30.

5704.2.10.3 Protection of piping from exposure fires. Piping shall not pass through adjacent diked areas or impounding basins, unless provided with a sealed sleeve or otherwise protected from exposure to fire.

5704.2.10.4 Combustible materials in diked areas. Diked areas shall be kept free from combustible materials, drums and barrels.

5704.2.10.5 Equipment, controls and piping in diked areas. Pumps, manifolds and fire protection equipment or controls shall not be located within diked areas or drainage basins or in a location where such equipment and controls would be endangered by fire in the diked area or drainage basin. Piping above ground shall be minimized and located as close as practical to the shell of the tank in diked areas or drainage basins.

Exceptions:

1. Pumps, manifolds and piping integral to the tanks or equipment being served, which is protected by intermediate diking, berms, drainage or fire protection such as water spray, monitors or resistive coating.
2. Fire protection equipment or controls that are appurtenances to the tanks or equipment being protected, such as foam chambers or foam piping and water or foam monitors and hydrants, or hand and wheeled extinguishers.

5704.2.11 Underground tanks. Underground storage of flammable and combustible liquids in tanks shall comply with Section 5704.2 and Sections 5704.2.11.1 through 5704.2.11.4.2.1.

5704.2.11.1 Location. Flammable and combustible liquid storage tanks located underground, either outside or under buildings, shall be in accordance with all of the following:

1. Tanks shall be located with respect to existing foundations and supports such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of a tank storing liquids to the nearest wall of a basement, pit, cellar or lot line shall be not less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

5704.2.11.2 Depth and cover. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with not less than 6 inches (152 mm) of noncorrosive inert material, such as clean sand.

5704.2.11.3 Overfill protection and prevention systems. Fill pipes shall be equipped with a spill container and an overfill prevention system in accordance with NFPA 30.

5704.2.11.4 Leak prevention. Leak prevention for underground tanks shall comply with Sections 5704.2.11.4.1 and 5704.2.11.4.2.

5704.2.11.4.1 Inventory control. Daily inventory records for underground storage tank systems shall be maintained.

5704.2.11.4.2 Leak detection. Underground storage tank systems shall be provided with an approved method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30.

5704.2.11.4.2.1 Location. The leak detection panel status shall be annunciated at an approved on-site location.

5704.2.12 Testing. Tank testing shall comply with Sections 5704.2.12.1 and 5704.2.12.2.

5704.2.12.1 Acceptance testing. Prior to being placed into service, tanks shall be tested in accordance with Section 21.5 of NFPA 30.

5704.2.12.2 Testing of underground tanks. Before being covered or placed in use, tanks and piping connected to underground tanks shall be tested for tightness in the presence of the fire code official. Piping shall be tested in accordance with Section 5703.6.3. The system shall not be covered until it has been approved.

5704.2.13 Abandonment and status of tanks. Tanks taken out of service shall be removed in accordance with Section 5704.2.14, or safeguarded in accordance with Sections 5704.2.13.1 through 5704.2.13.2.3 and API 1604.

5704.2.13.1 Underground tanks. Underground tanks taken out of service shall comply with Sections 5704.2.13.1.1 through 5704.2.13.1.5.

5704.2.13.1.1 Temporarily out of service. Underground tanks temporarily out of service shall have the fill line, gauge opening, vapor return and pump connection secure against tampering. Vent lines shall remain open and be maintained in accordance with Sections 5704.2.7.3 and 5704.2.7.4.

5704.2.13.1.2 Out of service for 90 days. Underground tanks not used for a period of 90 days shall be safeguarded in accordance with all the following or be removed in accordance with Section 5704.2.14:

1. Flammable or combustible liquids shall be removed from the tank.
2. All piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering.
3. Vent lines shall remain open and be maintained in accordance with Sections 5704.2.7.3 and 5704.2.7.4.

5704.2.13.1.3 Out of service for one year. Underground tanks that have been out of service for a period of one year shall be removed from the ground in accordance with Section 5704.2.14 or abandoned in place in accordance with Section 5704.2.13.1.4.

5704.2.13.1.4 Tanks abandoned in place. Tanks abandoned in place shall be as follows:

1. Flammable and combustible liquids shall be removed from the tank and connected piping.
2. The suction, inlet, gauge, vapor return and vapor lines shall be disconnected.
3. The tank shall be filled completely with an approved inert solid material.
4. Remaining underground piping shall be capped or plugged.
5. A record of tank size, location and date of abandonment shall be retained.
6. All exterior above-grade fill piping shall be permanently removed when tanks are abandoned or removed.

5704.2.13.1.5 Reinstallation of underground tanks. Tanks that are to be reinstalled for flammable or combustible liquid service shall be in accordance with this chapter, *ASME Boiler and Pressure Vessel Code* (Section VIII), API 1615, UL 58 and UL 1316.

5704.2.13.2 Above-ground tanks. Above-ground tanks taken out of service shall comply with Sections 5704.2.13.2.1 through 5704.2.13.2.3.

5704.2.13.2.1 Temporarily out of service. Above-ground tanks temporarily out of service shall have all connecting lines isolated from the tank and be secured against tampering.

Exception: In-place fire protection (foam) system lines.

5704.2.13.2.2 Out of service for 90 days. Above-ground tanks not used for a period of 90 days shall be safeguarded in accordance with Section 5704.2.13.1.2 or removed in accordance with Section 5704.2.14.

Exceptions:

1. Tanks and containers connected to oil burners that are not in use during the warm season of the year or are used as a backup heating system to gas.
2. In-place, active fire protection (foam) system lines.

5704.2.13.2.3 Out of service for one year. Above-ground tanks that have been out of service for a period of 1 year shall be removed in accordance with Section 5704.2.14.

Exception: Tanks within operating facilities.

5704.2.14 Removal and disposal of tanks. Removal and disposal of tanks shall comply with Sections 5704.2.14.1 and 5704.2.14.2.

5704.2.14.1 Removal. Removal of above-ground and underground tanks shall be in accordance with all of the following:

1. Flammable and combustible liquids shall be removed from the tank and connected piping.
2. Piping at tank openings that is not to be used further shall be disconnected.
3. Piping shall be removed from the ground.

   Exception: Piping is allowed to be abandoned in place where the fire code official determines that removal is not practical. Abandoned piping shall be capped and safeguarded as required by the fire code official.
4. Tank openings shall be capped or plugged, leaving a $^1/_8$-inch to $^1/_4$-inch-diameter (3.2 mm to 6.4 mm) opening for pressure equalization.
5. Tanks shall be purged of vapor and inerted prior to removal.
6. All exterior above-grade fill and vent piping shall be permanently removed.

   Exception: Piping associated with bulk plants, terminal facilities and refineries.

5704.2.14.2 Disposal. Tanks shall be disposed of in accordance with federal, state and local regulations.

5704.2.15 Maintenance. Above-ground tanks, connected piping and ancillary equipment shall be maintained in a safe operating condition. Tanks shall be maintained in accordance with their listings. Damage to above-ground tanks, connected piping or ancillary equipment shall be repaired using materials having equal or greater strength and fire resistance or the equipment shall be replaced or taken out of service.

5704.3 Container and portable tank storage. Storage of flammable and combustible liquids in closed containers that do not exceed 60 gallons (227 L) in individual capacity and portable tanks that do not exceed 660 gallons (2498 L) in individual capacity, and limited transfers incidental thereto, shall comply with Sections 5704.3.1 through 5704.3.8.5.

5704.3.1 Design, construction and capacity of containers and portable tanks. The design, construction and capacity of containers for the storage of Class I, II and IIIA liquids shall be in accordance with this section and Section 9.4 of NFPA 30.

5704.3.1.1 Approved containers. Only approved containers and portable tanks shall be used.

5704.3.2 Liquid storage cabinets. Where other sections of this code require that liquid containers be stored in storage cabinets, such cabinets and storage shall be in accordance with Sections 5704.3.2.1 through 5704.3.2.2.

5704.3.2.1 Design and construction of storage cabinets. Design and construction of liquid storage cabinets shall be in accordance with Sections 5704.3.2.1.1 through 5704.3.2.1.4.

5704.3.2.1.1 Materials. Cabinets shall be listed in accordance with UL 1275, or constructed of approved wood or metal in accordance with the following:

1. Unlisted metal cabinets shall be constructed of steel having a thickness of not less than 0.044 inch (1.12 mm) (18 gage). The cabinet, including the door, shall be double walled with $1^1/_2$-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting.
2. Unlisted wooden cabinets, including doors, shall be constructed of not less than 1-inch (25 mm) exterior grade plywood. Joints shall be rabbeted and shall be fastened in two directions with wood screws. Door hinges shall be of steel or brass. Cabinets shall be painted with an intumescent-type paint.

5704.3.2.1.2 Labeling. Cabinets shall be provided with a conspicuous label in red letters on contrasting background that reads: “FLAMMABLE—KEEP FIRE AWAY.”

5704.3.2.1.3 Doors. Doors shall be well fitted, self-closing and equipped with a three-point latch.

5704.3.2.1.4 Bottom. The bottom of the cabinet shall be liquid tight to a height of not less than 2 inches (51 mm).

5704.3.2.2 Capacity. The combined total quantity of liquids in a cabinet shall not exceed 120 gallons (454 L).

5704.3.3 Indoor storage. Storage of flammable and combustible liquids inside buildings in containers and portable tanks shall be in accordance with Sections 5704.3.3.1 through 5704.3.3.10.

Exceptions:

1. Liquids in the fuel tanks of motor vehicles, aircraft, boats or portable or stationary engines.
2. The storage of distilled spirits and wines in wooden barrels or casks.

5704.3.3.1 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with specific sections of this chapter and Section 906.

5704.3.3.2 Incompatible materials. Materials that will react with water or other liquids to produce a hazard shall not be stored in the same room with flammable and combustible liquids except where stored in accordance with Section 5003.9.8.

5704.3.3.3 Clear means of egress. Storage of any liquids, including stock for sale, shall not be stored near or be allowed to obstruct physically the route of egress.

5704.3.3.4 Empty containers or portable tank storage. The storage of empty tanks and containers previously used for the storage of flammable or combustible liquids, unless free from explosive vapors, shall be stored as required for filled containers and portable tanks. Portable tanks and containers, when emptied, shall have the covers or plugs immediately replaced in openings.

5704.3.3.5 Shelf storage. Shelving shall be of approved construction, adequately braced and anchored. Seismic requirements shall be in accordance with the *California Building Code*.

5704.3.3.5.1 Use of wood. Wood of not less than 1 inch (25 mm) nominal thickness is allowed to be used as shelving, racks, dunnage, scuffboards, floor overlay and similar installations.

5704.3.3.5.2 Displacement protection. Shelves shall be of sufficient depth and provided with a lip or guard to prevent individual containers from being displaced.

Exception: Shelves in storage cabinets or on laboratory furniture specifically designed for such use.

5704.3.3.5.3 Orderly storage. Shelf storage of flammable and combustible liquids shall be maintained in an orderly manner.

5704.3.3.6 Rack storage. Where storage on racks is allowed elsewhere in this code, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rack sections and any adjacent storage of liquids. Main aisles shall be not less than 8 feet (2438 mm) wide.

5704.3.3.7 Pile or palletized storage. Solid pile and palletized storage in liquid warehouses shall be arranged so that piles are separated from each other by not less than 4 feet (1219 mm). Aisles shall be provided and arranged so that containers or portable tanks are not more than 20 feet (6096 mm) from an aisle. Main aisles shall be not less than 8 feet (2438 mm) wide.

5704.3.3.8 Limited combustible storage. Limited quantities of combustible commodities are allowed to be stored in liquid storage areas where the ordinary combustibles, other than those used for packaging the liquids, are separated from the liquids in storage by not less than 8 feet (2438 mm) horizontally, either by open aisles or by open racks, and where protection is provided in accordance with Chapter 9.

5704.3.3.9 Idle combustible pallets. Storage of empty or idle combustible pallets inside an unprotected liquid storage area shall be limited to a maximum pile size of 2,500 square feet (232 m^2) and to a maximum storage height of 6 feet (1829 mm). Storage of empty or idle combustible pallets inside a protected liquid storage area shall comply with NFPA 13. Pallet storage shall be separated from liquid storage by aisles that are not less than 8 feet (2438 mm) wide.

5704.3.3.10 Containers in piles. Containers in piles shall be stacked in such a manner as to provide stability and to prevent excessive stress on container walls. Portable tanks stored more than one tier high shall be designed to nest securely, without dunnage. Material-handling equipment shall be suitable to handle containers and tanks safely at the upper tier level.

5704.3.4 Quantity limits for storage. Liquid storage quantity limitations shall comply with Sections 5704.3.4.1 through 5704.3.4.4.

5704.3.4.1 Maximum allowable quantity per control area. For occupancies other than Group M wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in this section.

For Group M occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 5704.3.4.1.

Storage of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with Chapter 27.

TABLE 5704.3.4.1—MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES OCCUPANCIES[a]

TYPE OF LIQUID	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
	Sprinklered[b] in accordance with footnote densities and arrangements	Sprinklered in accordance with Tables 5704.3.6.3(4) through 5704.3.6.3(8) and Table 5704.3.7.5.1	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. Control areas shall be separated from each other by not less than a 1-hour fire barrier.

b. To be considered as sprinklered, a building shall be equipped throughout with an *approved* automatic sprinkler system with a design providing minimum densities as follows:
   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.
   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-square-foot area.

c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to not more than 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

5704.3.4.2 Occupancy quantity limits. The following limits for quantities of stored flammable or combustible liquids shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
4. Group F occupancies: Quantities in dining, office, and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
6. Group M occupancies: Quantities in dining, office, and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1). The maximum allowable quantities for storage in wholesale and retail sales areas shall be in accordance with Section 5704.3.4.1.
7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).

5704.3.4.3 Quantities exceeding limits for control areas. Quantities exceeding those allowed in control areas set forth in Section 5704.3.4.1 shall be in liquid storage rooms or liquid storage warehouses in accordance with Sections 5704.3.7 and 5704.3.8.

5704.3.4.4 Liquids for maintenance and operation of equipment. In all occupancies, quantities of flammable and combustible liquids in excess of 10 gallons (38 L) used for maintenance purposes and the operation of equipment shall be stored in liquid storage cabinets in accordance with Section 5704.3.2. Quantities not exceeding 10 gallons (38 L) are allowed to be stored outside of a cabinet where in approved containers located in private garages or other approved locations.

5704.3.5 Storage in control areas. Storage of flammable and combustible liquids in control areas shall be in accordance with Sections 5704.3.5.1 through 5704.3.5.4.

5704.3.5.1 Basement storage. Class I liquids shall be allowed to be stored in basements in amounts not exceeding the maximum allowable quantity per control area for use-open systems in Table 5003.1.1(1), provided that fire protection systems are provided in accordance with Chapter 9. Class II and IIIA liquids shall be allowed to be stored in basements, provided that automatic suppression and other fire protection are provided in accordance with Chapter 9.

5704.3.5.2 Storage pile heights. Containers having less than a 30-gallon (114 L) capacity that contain Class I or II liquids shall not be stacked more than 3 feet (914.4 mm) or two containers high, whichever is greater, unless stacked on fixed shelving or otherwise satisfactorily secured. Containers of Class I or II liquids having a capacity of 30 gallons (114 L) or more shall not be stored more than one container high. Containers shall be stored in an upright position.

5704.3.5.3 Storage distance from ceilings and roofs. Piles of containers or portable tanks shall not be stored closer than 3 feet (914 mm) to the nearest beam, chord, girder or other obstruction, and shall be 3 feet (914 mm) below sprinkler deflectors or discharge orifices of water spray or other overhead fire protection system.

5704.3.5.4 Combustible materials. In areas that are not open to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

5704.3.6 Wholesale and retail sales uses. Flammable and combustible liquids in Group M occupancy wholesale and retail sales uses shall be in accordance with Sections 5704.3.6.1 through 5704.3.6.5, or Sections 10.10.2, 12.3.6, 16.4.1 through 16.4.3, 16.5.1 through 16.5.2.12, Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.2.1 through 16.5.2.12, of NFPA 30.

5704.3.6.1 Container type. Containers for Class I liquids shall be metal.

Exception: In sprinklered buildings, an aggregate quantity of 120 gallons (454 L) of water-miscible Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 16 ounces (0.473 L) or less.

5704.3.6.2 Container capacity. Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

Exception: Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the maximum allowable quantity per control area of Class IB and IC liquids in a control area. The building shall be equipped throughout with an approved automatic sprinkler system in accordance with Table 5704.3.4.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall not be stacked or stored in racks and shall not be located in areas open to the public.

5704.3.6.3 Fire protection and storage arrangements. Fire protection and container storage arrangements shall be in accordance with Table 5704.3.6.3(1) or the following:

1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table 5704.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with Tables 5704.3.6.3(5), 5704.3.6.3(6), and 5704.3.6.3(7) as appropriate, and the storage heights and arrangements shall be limited to those specified in Table 5704.3.6.3(3).

Combustible commodities shall not be stored above flammable and combustible liquids.

TABLE 5704.3.6.3(1)—MAXIMUM STORAGE HEIGHT IN CONTROL AREA

TYPE OF LIQUID	NONSPRINKLERED AREA (feet)	SPRINKLERED AREA[a] (feet)	SPRINKLERED WITH IN-RACK PROTECTION[a, b] (feet)
Flammable liquids:			
Class IA	4	4	4
Class IB	4	8	12
Class IC	4	8	12
Combustible liquids:			
Class II	6	8	12
Class IIIA	8	12	16
Class IIIB	8	12	20

For SI: 1 foot = 304.8 mm.

a In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

b. In-rack protection shall be in accordance with Table 5704.3.6.3(5), 5704.3.6.3(6) or 5704.3.6.3(7).

TABLE 5704.3.6.3(2)—STORAGE ARRANGEMENTS FOR PALLETIZED OR SOLID-PILE STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT			MAXIMUM QUANTITY PER PILE (gallons)		MAXIMUM QUANTITY PER ROOM[a] (gallons)	
		Drums	Containers[b] (feet)	Portable tanks[b] (feet)	Containers	Portable tanks	Containers	Portable tanks
IA	Ground floor	1	5	Not Allowed	3,000	Not Allowed	12,000	Not Allowed
	Upper floors	1	5	Not Allowed	2,000	Not Allowed	8,000	Not Allowed
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IB	Ground floor	1	6.5	7	5,000	20,000	15,000	40,000
	Upper floors	1	6.5	7	3,000	10,000	12,000	20,000
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IC	Ground floor[d]	1	6.5[c]	7	5,000	20,000	15,000	40,000
	Upper floors	1	6.5[c]	7	3,000	10,000	12,000	20,000
	Basements	0	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed	Not Allowed
II	Ground floor[d]	3	10	14	10,000	40,000	25,000	80,000
	Upper floors	3	10	14	10,000	40,000	25,000	80,000
	Basements	1	5	7	7,500	20,000	7,500	20,000
III	Ground floor	5	20	14	15,000	60,000	50,000	100,000
	Upper floors	5	20	14	15,000	60,000	50,000	100,000
	Basements	3	10	7	10,000	20,000	25,000	40,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See Section 5704.3.8.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

c. These height limitations are allowed to be increased to 10 feet for containers having a capacity of 5 gallons or less.

d. For palletized storage of unsaturated polyester resins (UPR) in relieving-style metal containers with 50 percent or less by weight Class IC or II liquid and no Class IA or IB liquid, height and pile quantity limits shall be permitted to be 10 feet and 15,000 gallons, respectively, provided that such storage is protected by sprinklers in accordance with NFPA 30 and that the UPR storage area is not located in the same containment area or drainage path for other Class I or II liquids.

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TABLE 5704.3.6.3(3)—STORAGE ARRANGEMENTS FOR RACK STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	TYPE RACK	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT[b] (feet)	MAXIMUM QUANTITY PER ROOM[a] (gallons)
			Containers	Containers
IA	Double row or Single row	Ground floor	25	7,500
		Upper floors	15	4,500
		Basements	Not Allowed	Not Allowed
IB IC	Double row or Single row	Ground floor	25	15,000
		Upper floors	15	9,000
		Basements	Not Allowed	Not Allowed
II	Double row or Single row	Ground floor	25	24,000
		Upper floors	25	24,000
		Basements	15	9,000
III	Multirow	Ground floor	40	48,000
	Double row	Upper floors	20	48,000
	Single row	Basements	20	24,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See Section 5704.3.8.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

TABLE 5704.3.6.3(4)—AUTOMATIC SPRINKLER PROTECTION FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS AND PORTABLE TANKS[a]

STORAGE CONDITIONS		CEILING SPRINKLER DESIGN AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAMS (hours)
Class liquid	Container size and arrangement	Density (gpm/ft^2)	Area (square feet)		Maximum spacing (square feet)		
			High-temperature sprinklers	Ordinary temperature sprinklers			
IA	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	750	2
	Containers greater than 5 gallons, on end or side, palletized or solid pile	0.60	5,000	8,000	80	750	
IB, IC and II	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	500	2
	Containers greater than 5 gallons on pallets or solid pile, one high	0.25	5,000	8,000	100		
II	Containers greater than 5 gallons on pallets or solid pile, more than one high, on end or side	0.60	5,000	8,000	80	750	2
IB, IC and II	Portable tanks, one high	0.30	3,000	5,000	100	500	2
II	Portable tanks, two high	0.60	5,000	8,000	80	750	2

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TABLE 5704.3.6.3(4)—AUTOMATIC SPRINKLER PROTECTION FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS AND PORTABLE TANKS[a]—continued

STORAGE CONDITIONS		CEILING SPRINKLER DESIGN AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAMS (hours)
Class liquid	Container size and arrangement	Density (gpm/ft^2)	Area (square feet)		Maximum spacing (square feet)		
			High-temperature sprinklers	Ordinary temperature sprinklers			
III	5 gallons or less, with or without cartons, palletized or solid pile	0.25	3,000	5,000	120	500	1
	Containers greater than 5 gallons on pallets or solid pile, on end or sides, up to three high	0.25	3,000	5,000	120	500	1
	Containers greater than 5 gallons, on pallets or solid pile, on end or sides, up to 18 feet high	0.35	3,000	5,000	100	750	2
	Portable tanks, one high	0.25	3,000	5,000	120	500	1
	Portable tanks, two high	0.50	3,000	5,000	80	750	2

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$.

a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. For storage heights above 4 feet or ceiling heights greater than 18 feet, an *approved* engineering design shall be provided in accordance with Section 104.2.2.

TABLE 5704.3.6.3(5)—AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS WITH OR WITHOUT CARTONS ON CONVENTIONAL WOOD PALLETS[a]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet)		Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice) 14 psi (large orifice)	Number of sprinklers operating		
		High-temperature sprinklers	Ordinary temperature sprinklers							
I (maximum 25-foot height) Option 1	0.40	3,000	5,000	80 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi (0.5-inch orifice)	1. Eight sprinklers if only one level 2. Six sprinklers each on two levels if only two levels 3. Six sprinklers each on top three levels, if three or more levels 4. Hydraulically most remote	750	2
I (maximum 25-foot height) Option 2	0.55	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	14 psi (0.53-inch orifice)	See 1 through 4 above	500	2
I and II (maximum 14-foot storage height) (maximum three tiers)	0.55[c]	2,000[d]	Not Applicable	100 ft^2/head	Not Applicable None for maximum 6-foot-deep racks	Not Applicable	Not Applicable	Not Applicable	500	2

TABLE 5704.3.6.3(5)—AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS WITH OR WITHOUT CARTONS ON CONVENTIONAL WOOD PALLETS[a]—continued

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet)		Maximum spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice)	Number of sprinklers operating		
		High-temperature sprinklers	Ordinary temperature sprinklers				14 psi (large orifice)			
II (maximum 25-foot height)	0.30	3,000	5,000	100 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers between levels at nearest 10-foot vertical intervals 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. Two lines between levels at nearest 10-foot vertical intervals 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level, up to a maximum of three levels	750	2
III (40-foot height)	0.25	3,000	5,000	120 ft^2/head	Same as for Class II liquids	Same as for Class II liquids	30 psi	Same as for Class II liquids	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. Using listed or approved extra-large orifices, high-temperature quick-response or standard element sprinklers under a maximum 30-foot ceiling with minimum 7.5-foot aisles.

c. For friction lid cans and other metal containers equipped with plastic nozzles or caps, the density shall be increased to 0.65 gpm per square foot using listed or approved extra-large orifice, high-temperature quick-response sprinklers.

d. Using listed or approved extra-large orifice, high-temperature quick-response or standard element sprinklers under a maximum 18-foot ceiling with minimum 7.5-foot aisles and metal containers.

TABLE 5704.3.6.3(6)—AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet)		Maximum spacing	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Minimum nozzle pressure	Number of sprinklers operating		
		High-temperature sprinklers	Ordinary temperature sprinklers							
IA (maximum 25-foot height)	0.60	3,000	5,000	80 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	30 psi	Hydraulically most remote—six sprinklers at each level	1,000	2
IB, IC and II (maximum 25-foot height)	0.60	3,000	5,000	100 ft^2/head	1. See 1 above 2. One line sprinklers every three tiers of storage 3. See 3 above 4. See 4 above	1. See 1 above 2. See 2 above 3. See 3 above 4. See 4 above	30 psi	Hydraulically most remote—six sprinklers at each level	750	2
III (maximum 40-foot height)	0.25	3,000	5,000	120 ft^2/head	1. See 1 above 2. One line sprinklers every sixth level (maximum) 3. See 3 above 4. See 4 above	1. See 1 above 2. One line sprinklers every third level (maximum) 3. See 3 above 4. See 4 above	15 psi	Hydraulically most remote—six sprinklers at each level	500	1

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$.

a. The design assumes the use of Class II standpipe systems. Where a Class I standpipe system is used, the area of application shall be increased by 30 percent without revising density.

TABLE 5704.3.6.3(7)—AUTOMATIC AFFF WATER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a, b]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND[c]				DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
	Density (gpm/ft^2)	Area (square feet)		On-end storage of drumson pallets, up to 25 feet	Minimum nozzle pressure (psi)	Number of sprinklers operating	Hose stream demand[d] (gpm)		
		High-temperature sprinklers	Ordinary temperature sprinklers						
IA, IB, IC and II	0.30	1,500	2,500	1. Ordinary temperature sprinkler up to 10 feet apart horizontally 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertically 4. Shields required for multiple-level	30	Three sprinklers per level	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$.

a. System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.

b. Except as modified herein, in-rack sprinklers shall be installed in accordance with NFPA 13.

c. The height of storage shall not exceed 25 feet.

d. Hose stream demand includes $1^1/_2$-inch inside hose connections, where required.

TABLE 5704.3.6.3(8)—AUTOMATIC SPRINKLER PROTECTION REQUIREMENTS FOR CLASS I LIQUID STORAGE IN METAL CONTAINERS OF 1-GALLON CAPACITY OR LESS WITH UNCARTONED OR CASE-CUT SHELF DISPLAY UP TO 6.5 FEET, AND PALLETIZED STORAGE ABOVE IN A DOUBLE-ROW RACK ARRAY[a]

STORAGE HEIGHT	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet)		Maximum spacing	Racks up to 9 feet deep	Racks 9 to 12 feet	Minimum nozzle pressure	Number of sprinklers operating		
		High temperature	Ordinary temperature							
Maximum 20-foot storage height	0.60	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line of sprinklers at the 6-foot level and the 11.5-foot level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multiple-level	Not Applicable	30 psi (standard orifice) or 14 psi (large orifice)	1. Six sprinklers each on two levels 2. Hydraulically most remote 12 sprinklers	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$.

a. This table shall not apply to racks with solid shelves.

b. Using extra-large orifice sprinklers under a ceiling 30 feet or less in height. Minimum aisle width is 7.5 feet.

5704.3.6.4 Warning for containers. Cans, containers and vessels containing flammable liquids or flammable liquid compounds or mixtures offered for sale shall be provided with a warning indicator, painted or printed on the container and stating that the liquid is flammable, and shall be kept away from heat and an open flame.

5704.3.6.5 Storage plan. Where required by fire the code official, aisle and storage plans shall be submitted in accordance with Chapter 50.

5704.3.7 Liquid storage rooms. Liquid storage rooms shall comply with Sections 5704.3.7.1 through 5704.3.7.5.2.

5704.3.7.1 General. Quantities of liquids exceeding those set forth in Section 5704.3.4.1 for storage in control areas shall be stored in a liquid storage room complying with this section and constructed and separated as required by the *California Building Code*.

5704.3.7.2 Quantities and arrangement of storage. The quantity limits and storage arrangements in liquid storage rooms shall be in accordance with Tables 5704.3.6.3(2) and 5704.3.6.3(3) and Sections 5704.3.7.2.1 through 5704.3.7.2.3.

5704.3.7.2.1 Mixed storage. Where two or more classes of liquids are stored in a pile or rack section, both of the following shall apply:

1. The quantity in that pile or rack shall not exceed the smallest of the maximum quantities for the classes of liquids stored in accordance with Table 5704.3.6.3(2) or 5704.3.6.3(3).
2. The height of storage in that pile or rack shall not exceed the smallest of the maximum heights for the classes of liquids stored in accordance with Table 5704.3.6.3(2) or 5704.3.6.3(3).

5704.3.7.2.2 Separation and aisles. Piles shall be separated from each other by not less than 4-foot (1219 mm) aisles. Aisles shall be provided so that all containers are 20 feet (6096 mm) or less from an aisle. Where the storage of liquids is on racks, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rows of racks and adjacent storage of liquids. Main aisles shall be not less than 8 feet (2438 mm) wide.

Additional aisles shall be provided for access to doors, required windows and ventilation openings, standpipe connections, mechanical equipment and switches. Such aisles shall be not less than 3 feet (914 mm) in width, unless greater widths are required for separation of piles or racks, in which case the greater width shall be provided.

5704.3.7.2.3 Stabilizing and supports. Containers and piles shall be separated by pallets or dunnage to provide stability and to prevent excessive stress to container walls. Portable tanks stored over one tier shall be designed to nest securely without dunnage.

Requirements for portable tank design shall be in accordance with Chapters 9 and 12 of NFPA 30. Shelving, racks, dunnage, scuffboards, floor overlay and similar installations shall be of noncombustible construction or of wood not less than a 1-inch (25 mm) nominal thickness. Adequate material-handling equipment shall be available to handle tanks safely at upper tier levels.

5704.3.7.3 Spill control and secondary containment. Liquid storage rooms shall be provided with spill control and secondary containment in accordance with Section 5004.2.

5704.3.7.4 Ventilation. Liquid storage rooms shall be ventilated in accordance with Section 5004.3.

5704.3.7.5 Fire protection. Fire protection for liquid storage rooms shall comply with Sections 5704.3.7.5.1 and 5704.3.7.5.2.

5704.3.7.5.1 Fire-protection systems. Liquid storage rooms shall be protected by automatic sprinkler systems installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(7) and Table 5704.3.7.5.1. In-rack sprinklers shall also comply with NFPA 13.

Automatic foam-water systems and automatic aqueous film-forming foam (AFFF) water sprinkler systems shall not be used except where approved.

Protection criteria developed from fire modeling or full-scale fire testing conducted at an approved testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where approved.

TABLE 5704.3.7.5.1—AUTOMATIC AFFF-WATER PROTECTION REQUIREMENTS FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS[a, b]

PACKAGE TYPE	CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND					STORAGE HEIGHT (feet)	HOSE DEMAND (gpm)[c]	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
		Density (gpm/ft^2)	Area (square feet)	Temperature rating	Maximum spacing	Orifice size (inch)				
Cartoned	IB, IC, II and III	0.40	2,000	286°F	100 ft^2/head	0.531	11	500	15	2
Uncartoned	IB, IC, II and III	0.30	2,000	286°F	100 ft^2/head	0.5 or 0.531	12	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$, °C = (°F – 32)/1.8.

a. System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.

b. Maximum ceiling height of 30 feet.

c. Hose stream demand includes $1^1/_2$-inch inside hose connections, where required.

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5704.3.7.5.2 Portable fire extinguishers. Not less than one approved portable fire extinguisher complying with Section 906 and having a rating of not less than 20-B shall be located not less than 10 feet (3048 mm) or more than 50 feet (15 240 mm) from any Class I or II liquid storage area located outside of a liquid storage room.

Not less than one portable fire extinguisher having a rating of not less than 20-B shall be located outside of, but not more than 10 feet (3048 mm) from, the door opening into a liquid storage room.

5704.3.8 Liquid storage warehouses. Buildings used for storage of flammable or combustible liquids in quantities exceeding those set forth in Section 5704.3.4 for control areas and Section 5704.3.7 for liquid storage rooms shall comply with Sections 5704.3.8.1 through 5704.3.8.5 and shall be constructed and separated as required by the *California Building Code*.

5704.3.8.1 Quantities and storage arrangement. The total quantities of liquids in a liquid storage warehouse shall not be limited. The arrangement of storage shall be in accordance with Table 5704.3.6.3(2) or 5704.3.6.3(3).

5704.3.8.1.1 Mixed storage. Mixed storage shall be in accordance with Section 5704.3.7.2.1.

5704.3.8.1.2 Separation and aisles. Separation and aisles shall be in accordance with Section 5704.3.7.2.2.

5704.3.8.2 Spill control and secondary containment. Liquid storage warehouses shall be provided with spill control and secondary containment as set forth in Section 5004.2.

5704.3.8.3 Ventilation. Liquid storage warehouses storing containers greater than 5 gallons (19 L) in capacity shall be ventilated at a rate of not less than 0.25 cfm per square foot (0.00127 $m^3/s \times m^2$) of floor area over the storage area.

5704.3.8.4 Automatic sprinkler systems. Liquid storage warehouses shall be protected by automatic sprinkler systems installed in accordance with Chapter 9 and Tables 5704.3.6.3(4) through 5704.3.6.3(7) and Table 5704.3.7.5.1, or Sections 16.4.1 through 16.4.3, 16.5.1 through 16.5.3.12, and Figures 16.4.1(a) through 16.4.1(c) and Tables 16.5.3.1 through 16.5.3.12 of NFPA 30. In-rack sprinklers shall also comply with NFPA 13.

Automatic foam-water systems and automatic AFFF water sprinkler systems shall not be used except where approved.

Protection criteria developed from fire modeling or full-scale fire testing conducted at an approved testing laboratory are allowed in lieu of the protection as shown in Tables 5704.3.6.3(2) through 5704.3.6.3(7) and Table 5704.3.7.5.1 where approved.

5704.3.8.5 Warehouse hose lines. In liquid storage warehouses, either $1^1/_2$-inch (38 mm) lined or 1-inch (25 mm) hard rubber hose lines shall be provided in sufficient number to reach all liquid storage areas and shall be in accordance with Section 903 or 905.

5704.4 Outdoor storage of containers and portable tanks. Storage of flammable and combustible liquids in closed containers and portable tanks outside of buildings shall be in accordance with Section 5703 and Sections 5704.4.1 through 5704.4.8. Capacity limits for containers and portable tanks shall be in accordance with Section 5704.3.

5704.4.1 Plans. Storage shall be in accordance with approved plans.

5704.4.2 Location on property. Outdoor storage of liquids in containers and portable tanks shall be in accordance with Table 5704.4.2. Storage of liquids near buildings located on the same lot shall be in accordance with this section.

TABLE 5704.4.2—OUTDOOR LIQUID STORAGE IN CONTAINERS AND PORTABLE TANKS

CLASS OF LIQUID	CONTAINER STORAGE—MAXIMUM PER PILE		PORTABLE TANK STORAGE—MAXIMUM PER PILE		MINIMUM DISTANCE BETWEEN PILES OR RACKS (feet)	MINIMUM DISTANCE TO LOT LINE OF PROPERTY THAT CAN BE BUILT ON[c, d] (feet)	MINIMUM DISTANCE TO PUBLIC STREET, PUBLIC ALLEY OR PUBLIC WAY[d] (feet)
	Quantity[a, b] (gallons)	Height (feet)	Quantity[a, b] (gallons)	Height (feet)			
IA	1,100	10	2,200	7	5	50	10
IB	2,200	12	4,400	14	5	50	10
IC	4,400	12	8,800	14	5	50	10
II	8,800	12	17,600	14	5	25	5
III	22,000	18	44,000	14	5	10	5

For SI: 1 foot = 304.8 mm, 1 gallon 3.785 L.

a. For mixed class storage, see Section 5704.4.2.

b. For storage in racks, the quantity limits per pile do not apply, but the rack arrangement shall be limited to not more than 50 feet in length and two rows or 9 feet in depth.

c. If protection by a public fire department or private fire brigade capable of providing cooling water streams is not available, the distance shall be doubled.

d. Where the total quantity stored does not exceed 50 percent of the maximum allowed per pile, the distances are allowed to be reduced 50 percent, but not less than 3 feet.

5704.4.2.1 Mixed liquid piles. Where two or more classes of liquids are stored in a single pile, the quantity in the pile shall not exceed the smallest of maximum quantities for the classes of material stored.

5704.4.2.2 Access. Storage of containers or portable tanks shall be provided with fire apparatus access roads in accordance with Chapter 5.

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5704.4.2.3 Security. The storage area shall be protected against tampering or trespassers where necessary and shall be kept free from weeds, debris and other combustible materials not necessary to the storage.

5704.4.2.4 Storage adjacent to buildings. Not more than 1,100 gallons (4163 L) of liquids stored in closed containers and portable tanks is allowed adjacent to a building located on the same premises and under the same management, provided that one of the following requirements is met:

1. The building does not exceed one story in height. Such building shall be of fire-resistance-rated construction with noncombustible exterior surfaces or noncombustible construction and shall be used principally for the storage of liquids.
2. The exterior building wall adjacent to the storage area shall have a fire-resistance rating of not less than 2 hours, having no openings to above-grade areas within 10 feet (3048 mm) horizontally of such storage and no openings to below-grade areas within 50 feet (15 240 mm) horizontally of such storage.

The quantity of liquids stored adjacent to a building protected in accordance with Item 2 is allowed to exceed 1,100 gallons (4163 L), provided that the maximum quantity per pile does not exceed 1,100 gallons (4163 L) and each pile is separated by a 10-foot-minimum (3048 mm) clear space along the common wall.

Where the quantity stored exceeds 1,100 gallons (4163 L) adjacent to a building complying with Item 1, or the provisions of Item 1 cannot be met, a minimum distance in accordance with Table 5704.4.2, column 7 ("Minimum Distance to Lot Line of Property That Can Be Built On") shall be maintained between buildings and the nearest container or portable tank.

5704.4.3 Spill control and secondary containment. Storage areas shall be provided with spill control and secondary containment in accordance with Section 5703.4.

Exception: Containers stored on approved containment pallets in accordance with Section 5004.2.3 and containers stored in cabinets and lockers with integral spill containment.

5704.4.4 Security. Storage areas shall be protected against tampering or trespassers by fencing or other approved control measures.

5704.4.5 Protection from vehicles. Guard posts or other means shall be provided to protect exterior storage tanks from vehicular damage. Where guard posts are installed, the posts shall be installed in accordance with Section 312.

5704.4.6 Clearance from combustibles. The storage area shall be kept free from weeds, debris and combustible materials not necessary to the storage. The area surrounding an exterior storage area shall be kept clear of such materials for a minimum distance of 15 feet (4572 mm).

5704.4.7 Weather protection. Weather protection for outdoor storage shall be in accordance with Section 5004.13.

5704.4.8 Empty containers and tank storage. The storage of empty tanks and containers previously used for the storage of flammable or combustible liquids, unless free from explosive vapors, shall be stored as required for filled containers and tanks. Tanks and containers when emptied shall have the covers or plugs immediately replaced in openings.

SECTION 5705—DISPENSING, USE, MIXING AND HANDLING

5705.1 Scope. Dispensing, use, mixing and handling of flammable liquids shall be in accordance with Section 5703 and this section. Tank vehicle and tank car loading and unloading and other special operations shall be in accordance with Section 5706.

Exception: Containers of organic coatings having no fire point and which are opened for pigmentation are not required to comply with this section.

5705.2 Liquid transfer. Liquid transfer equipment and methods for transfer of Class I, II and IIIA liquids shall be approved and be in accordance with Sections 5705.2.1 through 5705.2.6.

5705.2.1 Pumps. Where positive-displacement pumps are used, they shall be provided with pressure relief discharging back to the tank, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

5705.2.2 Pressured systems. Where gases are introduced to provide for transfer of Class I liquids, or Class II and III liquids transferred at temperatures at or above their flash points by pressure, only inert gases shall be used. Controls, including pressure relief devices, shall be provided to limit the pressure so that the maximum working pressure of tanks, containers and piping systems cannot be exceeded. Where devices operating through pressure within a tank or container are used, the tank or container shall be a pressure vessel approved for the intended use. Air or oxygen shall not be used for pressurization.

Exception: Air transfer of Class II and III liquids at temperatures below their flash points.

5705.2.3 Piping, hoses and valves. Piping, hoses and valves used in liquid transfer operations shall be approved or listed for the intended use.

5705.2.4 Class I, II and III liquids. Class I liquids or, when heated to or above their flash points, Class II and Class III liquids, shall be transferred by one of the following methods:

1. From safety cans complying with UL 30.
2. Through an approved closed piping system.
3. From containers or tanks by an approved pump taking suction through an opening in the top of the container or tank.

4. For Class IB, IC, II and III liquids, from containers or tanks by gravity through an approved self-closing or automatic-closing valve where the container or tank and dispensing operations are provided with spill control and secondary containment in accordance with Section 5703.4. Class IA liquids shall not be dispensed by gravity from tanks.
5. Approved engineered liquid transfer systems.

Exception: Liquids in original shipping containers not exceeding a 5.3-gallon (20 L) capacity.

5705.2.5 Manual container filling operations. Class I liquids or Class II and Class III liquids that are heated up to or above their flash points shall not be transferred into containers unless the nozzle and containers are electrically interconnected. Acceptable methods of electrical interconnection include either of the following:

1. Metallic floor plates on which containers stand while filling, where such floor plates are electrically connected to the fill stem.
2. Where the fill stem is bonded to the container during filling by means of a bond wire.

5705.2.6 Automatic container-filling operations for Class I liquids. Container-filling operations for Class I liquids involving conveyor belts or other automatic-feeding operations shall be designed to prevent static accumulations.

5705.3 Use, dispensing and mixing inside of buildings. Indoor use, dispensing and mixing of flammable and combustible liquids shall be in accordance with Section 5705.2 and Sections 5705.3.1 through 5705.3.5.3.

5705.3.1 Closure of mixing or blending vessels. Vessels used for mixing or blending of Class I liquids and Class II or III liquids heated up to or above their flash points shall be provided with self-closing, tight-fitting, noncombustible lids that will control a fire within such vessel.

Exception: Where such devices are impractical, approved automatic or manually controlled fire-extinguishing devices shall be provided.

5705.3.2 Bonding of vessels. Where differences of potential could be created, vessels containing Class I liquids or liquids handled at or above their flash points shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system to maintain equipment at the same electrical potential to prevent sparking.

5705.3.3 Heating, lighting and cooking appliances. Heating, lighting and cooking appliances that utilize Class I liquids shall not be operated within a building or structure.

Exception: Operation in single-family dwellings.

5705.3.4 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines of adjoining property that can be built on, in accordance with Tables 5705.3.4(1) and 5705.3.4(2).

Exception: Where the exterior wall facing the adjoining lot line is a blank wall having a fire-resistance rating of not less than 4 hours, the fire code official is authorized to modify the distances. The distance shall be not less than that set forth in the *California Building Code*, and where Class IA or unstable liquids are involved, explosion control shall be provided in accordance with Section 911.

TABLE 5705.3.4(1)—SEPARATION OF PROCESSING VESSELS FROM LOT LINES

PROCESSING VESSELS WITH EMERGENCY RELIEF VENTING	LOCATION[a]	
	Stable liquids	Unstable liquids
Not in excess of 2.5 psig	Table 5705.3.4(2)	2.5 times Table 5705.3.4(2)
Over 2.5 psig	1.5 times Table 5705.3.4(2)	4 times Table 5705.3.4(2)

For SI: 1 pound per square inch gauge = 6.895 kPa.

a. Where protection of exposures by a public fire department or private fire brigade capable of providing cooling water streams on structures is not provided, distances shall be doubled.

TABLE 5705.3.4(2)—REFERENCE TABLE FOR USE WITH TABLE 5705.3.4(1)

TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE OF A LOT THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY OR FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25

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TABLE 5705.3.4(2)—REFERENCE TABLE FOR USE WITH TABLE 5705.3.4(1)—continued		
TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE OF A LOT THAT IS OR CAN BE BUILT ON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY OR FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60
For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.		

5705.3.5 Quantity limits for use. Liquid use quantity limitations shall comply with Sections 5705.3.5.1 through 5705.3.5.3.

5705.3.5.1 Maximum allowable quantity per control area. Indoor use, dispensing and mixing of flammable and combustible liquids shall not exceed the maximum allowable quantity per control area indicated in Table 5003.1.1(1) and shall not exceed the additional limitations set forth in Section 5705.3.5.

Use of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with Chapter 27.

Exception: Cleaning with Class I, II and IIIA liquids shall be in accordance with Section 5705.3.6.

5705.3.5.2 Occupancy quantity limits. The following limits for quantities of flammable and combustible liquids used, dispensed or mixed based on occupancy classification shall not be exceeded:

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 5003.1.1(1).
4. Group F occupancies: Quantities in dining, office and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
6. Group M occupancies: Quantities in dining, office and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 5003.1.1(1).
8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 5003.1.1(1).

Exception: Cleaning with Class I, II, or IIIA liquids shall be in accordance with Section 5705.3.6.

5705.3.5.3 Quantities exceeding limits for control areas. Quantities exceeding the maximum allowable quantity per control area indicated in Sections 5705.3.5.1 and 5705.3.5.2 shall be in accordance with the following:

1. For open systems, indoor use, dispensing and mixing of flammable and combustible liquids shall be within a room or building complying with the *California Building Code* and Sections 5705.3.7.1 through 5705.3.7.5.3.
2. For closed systems, indoor use, dispensing and mixing of flammable and combustible liquids shall be within a room or building complying with the *California Building Code* and Sections 5705.3.7 through 5705.3.7.4 and Section 5705.3.7.6.

5705.3.6 Cleaning with flammable and combustible liquids. Cleaning with Class I, II and IIIA liquids shall be in accordance with Sections 5705.3.6.1 through 5705.3.6.2.7.

Exceptions:

1. Dry cleaning shall be in accordance with Chapter 21.
2. Spray-nozzle cleaning shall be in accordance with Section 2403.3.5.

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5705.3.6.1 Cleaning operations. Class IA liquids shall not be used for cleaning. Cleaning with Class IB, IC or II liquids shall be conducted in accordance with one of the following:

1. In a room or building, Section 5705.3.7.
2. In a parts cleaner listed, labeled and approved for the purpose, Section 5705.3.6.2.

Exception: Materials used in commercial and industrial process-related cleaning operations in accordance with other provisions of this code and not involving facilities maintenance cleaning operations.

5705.3.6.2 Listed and approved machines. Parts cleaning and degreasing conducted in listed and approved machines in accordance with Section 5705.3.6.1 shall be in accordance with Sections 5705.3.6.2.1 through 5705.3.6.2.7.

5705.3.6.2.1 Solvents. Solvents shall be classified and shall be compatible with the machines within which they are used.

5705.3.6.2.2 Machine capacities. The quantity of solvent shall not exceed the listed design capacity of the machine for the solvent being used with the machine.

5705.3.6.2.3 Solvent quantity limits. Solvent quantities shall be limited as follows:

1. Machines without remote solvent reservoirs shall be limited to quantities set forth in Section 5705.3.5.
2. Machines with remote solvent reservoirs using Class I liquids shall be limited to quantities set forth in Section 5705.3.5.
3. Machines with remote solvent reservoirs using Class II liquids shall be limited to 35 gallons (132 L) per machine. The total quantities shall not exceed an aggregate of 240 gallons (908 L) per control area in buildings not equipped throughout with an approved automatic sprinkler system and an aggregate of 480 gallons (1817 L) per control area in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
4. Machines with remote solvent reservoirs using Class IIIA liquids shall be limited to 80 gallons (303 L) per machine.

5705.3.6.2.4 Immersion soaking of parts. Work areas of machines with remote solvent reservoirs shall not be used for immersion soaking of parts.

5705.3.6.2.5 Separation. Multiple machines shall be separated from each other by a distance of not less than 30 feet (9144 mm) or by a fire barrier with a minimum 1-hour fire-resistance rating.

5705.3.6.2.6 Ventilation. Machines shall be located in areas adequately ventilated to prevent accumulation of vapors.

5705.3.6.2.7 Installation. Machines shall be installed in accordance with their listings.

5705.3.7 Rooms or buildings for quantities exceeding the maximum allowable quantity per control area. Where required by Section 5705.3.5.3 or 5705.3.6.1, rooms or buildings used for the use, dispensing or mixing of flammable and combustible liquids in quantities exceeding the maximum allowable quantity per control area shall be in accordance with Sections 5705.3.7.1 through 5705.3.7.6.3.

5705.3.7.1 Construction, location and fire protection. Rooms or buildings classified in accordance with the *California Building Code* as Group H-2 or H-3 occupancies based on use, dispensing or mixing of flammable or combustible liquids shall be constructed in accordance with the *California Building Code*.

5705.3.7.2 Basements. In rooms or buildings classified in accordance with the *California Building Code* as Group H-2 or H-3, dispensing or mixing of flammable or combustible liquids shall not be conducted in basements.

5705.3.7.3 Fire protection. Rooms or buildings classified in accordance with the *California Building Code* as Group H-2 or H-3 occupancies shall be equipped with an approved automatic fire-extinguishing system in accordance with Chapter 9.

5705.3.7.4 Doors. Interior doors to rooms or portions of such buildings shall be self-closing fire doors in accordance with the *California Building Code*.

5705.3.7.5 Open systems. Use, dispensing and mixing of flammable and combustible liquids in open systems shall be in accordance with Sections 5705.3.7.5.1 through 5705.3.7.5.3.

5705.3.7.5.1 Ventilation. Continuous mechanical ventilation shall be provided at a rate of not less than 1 cfm per square foot [0.00508 $m^3/(s \times m^2)$] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided where needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the *California Building Code* and *California Mechanical Code*.

Exception: Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.

5705.3.7.5.2 Explosion control. Explosion control shall be provided in accordance with Section 911.

5705.3.7.5.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 5703.4 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 5703.4 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

5705.3.7.6 Closed systems. Use or mixing of flammable or combustible liquids in closed systems shall be in accordance with Sections 5705.3.7.6.1 through 5705.3.7.6.3.

5705.3.7.6.1 Ventilation. Closed systems designed to be opened as part of normal operations shall be provided with ventilation in accordance with Section 5705.3.7.5.1.

5705.3.7.6.2 Explosion control. Explosion control shall be provided where an explosive environment can occur as a result of the mixing or use process. Explosion control shall be designed in accordance with Section 911.

Exception: Where process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

5705.3.7.6.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 5703.4 where flammable or combustible liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 5703.4 where the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).

5705.3.8 Use, dispensing and handling outside of buildings. Outside use, dispensing and handling shall be in accordance with Sections 5705.3.8.1 through 5705.3.8.4.

Dispensing of liquids into motor vehicle fuel tanks at motor fuel-dispensing facilities shall be in accordance with Chapter 23.

5705.3.8.1 Spill control. Outside use, dispensing and handling areas shall be provided with spill control as set forth in Section 5703.4.

5705.3.8.2 Location on property. Dispensing activities that exceed the quantities set forth in Table 5705.3.8.2 shall not be conducted within 15 feet (4572 mm) of buildings or combustible materials or within 25 feet (7620 mm) of building openings, lot lines, public streets, public alleys or public ways. Dispensing activities that exceed the quantities set forth in Table 5705.3.8.2 shall not be conducted within 15 feet (4572 mm) of storage of Class I, II or III liquids unless such liquids are stored in tanks that are listed and labeled as 2-hour protected tank assemblies in accordance with UL 2085.

Exceptions:

1. The requirements shall not apply to areas where only the following are dispensed: Class III liquids; liquids that are heavier than water; water-miscible liquids; and liquids with viscosities greater than 10,000 centipoise (cp) (10 Pa × s).
2. Flammable and combustible liquid dispensing in refineries, chemical plants, process facilities, gas and crude oil production facilities and oil-blending and packaging facilities, terminals and bulk plants.

TABLE 5705.3.8.2—MAXIMUM ALLOWABLE QUANTITIES FOR DISPENSING FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OUTDOOR CONTROL AREAS[a, b]

CLASS OF LIQUID	QUANTITY (gallons)
Flammable	
Class IA	10
Class IB	15
Class IC	20
Combination Class IA, IB and IC	30[c]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

For SI: 1 gallon = 3.785 L.

a. For definition of "*Outdoor Control Area*," see Section 202.

b. The fire code official is authorized to impose special conditions regarding locations, types of containers, dispensing units, fire control measures and other factors involving fire safety.

c. Containing not more than the maximum allowable quantity per control area of each individual class.

5705.3.8.3 Location of processing vessels. Processing vessels shall be located with respect to distances to *lot lines* that can be built on in accordance with Table 5705.3.4(1).

Exception: In refineries and distilleries.

5705.3.8.4 Weather protection. Weather protection for outdoor use shall be in accordance with Section 5005.3.9.

5705.4 Solvent distillation units. Solvent distillation units shall comply with Sections 5705.4.1 through 5705.4.9.

5705.4.1 Unit with a capacity of 60 gallons or less. Solvent distillation units used to recycle Class I, II or IIIA liquids having a distillation chamber capacity of 60 gallons (227 L) or less shall be listed, labeled and installed in accordance with Section 5705.4 and UL 2208.

Exceptions:

1. Solvent distillation units used in continuous through-put industrial processes where the source of heat is remotely supplied using steam, hot water, oil or other heat transfer fluids, the temperature of which is below the auto-ignition point of the solvent.

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2. Approved research, testing and experimental processes.

5705.4.2 Units with a capacity exceeding 60 gallons. Solvent distillation units used to recycle Class I, II or IIIA liquids, having a distillation chamber capacity exceeding 60 gallons (227 L) shall be used in locations that comply with the use and mixing requirements of Section 5705 and other applicable provisions in this chapter.

5705.4.3 Prohibited processing. Class I, II and IIIA liquids that are classified as unstable (reactive) shall not be processed in solvent distillation units.

Exception: Appliances listed for the distillation of unstable (reactive) solvents.

5705.4.4 Labeling. A permanent label shall be affixed to the unit by the manufacturer. The label shall indicate the capacity of the distillation chamber, and the distance the unit shall be placed away from sources of ignition. The label shall indicate the products for which the unit has been listed for use or refer to the instruction manual for a list of the products.

5705.4.5 Manufacturer's instruction manual. An instruction manual shall be provided. The manual shall be readily available for the user and the fire code official. The manual shall include installation, use and servicing instructions. It shall identify the liquids for which the unit has been listed for distillation purposes along with each liquid's flash point and auto-ignition temperature. For units with adjustable controls, the manual shall include directions for setting the heater temperature for each liquid to be instilled.

5705.4.6 Location. Solvent distillation units shall be used in locations in accordance with the listing. Solvent distillation units shall not be used in basements.

5705.4.7 Storage of liquids. Distilled liquids and liquids awaiting distillation shall be stored in accordance with Section 5704.

5705.4.8 Storage of residues. Hazardous residue from the distillation process shall be stored in accordance with Section 5704 and Chapter 50.

5705.4.9 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with Section 906. Not less than one portable fire extinguisher having a rating of not less than 40-B shall be located not less than 10 feet (3048 mm) or more than 30 feet (9144 mm) from any solvent distillation unit.

5705.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. Dispensers shall not be located above, below or closer than 1 inch (25 mm) to an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor or intervening counter top shall be free of electrical receptacles, switches, appliances, devices or other ignition sources.
4. Dispensers shall be located so that the bottom of the dispenser is not less than 42 inches (1067 mm) and not more than 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not obstruct required means of egress or be placed within 3 feet (914 mm) of an open flame, heating device or other ignition source.
6. Dispensers shall not release their contents except when the dispenser is manually activated. Facilities shall be permitted to install and use automatically activated "touch free" alcohol-based hand-rub dispensing devices with the following requirements:
    6.1. The facility or persons responsible for the dispensers shall test the dispensers each time a new refill is installed in accordance with the manufacturer's care and use instructions.
    6.2. Dispensers shall be designed and must operate in a manner that ensures accidental or malicious activations of the dispensing device are minimized. At a minimum, all devices subject to or used in accordance with this section shall have the following safety features:
        6.2.1. Any activations of the dispenser shall only occur when an object is placed within 4 inches (98 mm) of the sensing device.
        6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with label instructions as regulated by the United States Food and Drug Administration (USFDA).
        6.2.3. An object placed within the activation zone and left in place will cause only one activation.
7. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 5704 and 5705.
8. Dispensers located in occupancies with carpeted floors shall only be allowed in smoke compartments or fire areas equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

5705.5.1 Corridor installations. In addition to the provisions of Section 5705.5, where dispensers containing alcohol-based hand rubs are located in corridors or rooms and areas open to the corridor, they shall be in accordance with all of the following:

1. Level 2 and 3 aerosol containers shall not be allowed in corridors.
2. The maximum capacity of each Class I or II liquid dispenser shall be 41 ounces (1.21 L) and the maximum capacity of each Level 1 aerosol dispenser shall be 18 ounces (0.51 kg).

3. The maximum quantity allowed in a corridor within a control area shall be 10 gallons (37.85 L) of Class I or II liquids or 1135 ounces (32.2 kg) of Level 1 aerosols, or a combination of Class I or II liquids and Level 1 aerosols not to exceed, in total, the equivalent of 10 gallons (37.85 L) or 1,135 ounces (32.2 kg) such that the sum of the ratios of the liquid and aerosol quantities divided by the allowable quantity of liquids and aerosols, respectively, shall not exceed one.
4. Projections into a corridor shall be in accordance with Section 1003.3.3.

SECTION 5706—SPECIAL OPERATIONS

5706.1 General. This section shall cover the provisions for special operations that include, but are not limited to, storage, use, dispensing, mixing or handling of flammable and combustible liquids. The following special operations shall be in accordance with Sections 5701, 5703, 5704 and 5705, except as provided in Section 5706.

1. Storage and dispensing of flammable and combustible liquids on farms and construction sites.
2. Well drilling and operating.
3. Bulk plants or terminals.
4. Bulk transfer and process transfer operations utilizing tank vehicles and tank cars.
5. Tank vehicles and tank vehicle operation.
6. Refineries.
7. Vapor recovery and vapor-processing systems.

5706.2 Storage and dispensing of flammable and combustible liquids on farms and construction sites. Permanent and temporary storage and dispensing of Class I and II liquids for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits or borrow pits shall be in accordance with Sections 5706.2.1 through 5706.2.8.1.

Exception: Storage and use of fuel oil and containers connected with oil-burning equipment regulated by Section 605 and the *California Mechanical Code*.

5706.2.1 Combustibles and open flames near tanks. Storage areas shall be kept free from weeds and extraneous combustible material. Open flames and smoking are prohibited in flammable or combustible liquid storage areas.

5706.2.2 Marking of tanks and containers. Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product that they contain and the words: "FLAMMABLE—KEEP FIRE AND FLAME AWAY." Tanks shall bear the additional marking: "KEEP 50 FEET FROM BUILDINGS."

5706.2.3 Containers for storage and use. Metal containers used for storage of Class I or II liquids shall be in accordance with DOTn requirements or shall be of an approved design.

Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or approved self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

Containers stored outside of buildings shall be in accordance with Section 5704 and the *California Building Code*.

5706.2.4 Permanent and temporary tanks. The capacity of permanent above-ground tanks containing Class I or II liquids shall not exceed 1,100 gallons (4164 L). The capacity of temporary above-ground tanks containing Class I or II liquids shall not exceed 10,000 gallons (37 854 L). Tanks shall be of the single-compartment design.

Exception: Permanent above-ground tanks of greater capacity that meet the requirements of Section 5704.2.

5706.2.4.1 Fill-opening security. Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.

5706.2.4.2 Vents. Tanks shall be provided with a method of normal and emergency venting. Normal vents shall be in accordance with Section 5704.2.7.3.

Emergency vents shall be in accordance with Section 5704.2.7.4. Emergency vents shall be arranged to discharge in a manner that prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.

5706.2.4.3 Location. Tanks containing Class I or II liquids shall be kept outside and not less than 50 feet (15 240 mm) from buildings and combustible storage. Additional distance shall be provided where necessary to ensure that vehicles, equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures, haystacks or other combustible storage.

5706.2.4.4 Locations where above-ground tanks are prohibited. The storage of Class I and II liquids in above-ground tanks is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction.

5706.2.5 Type of tank. Tanks shall be provided with top openings only or shall be elevated for gravity discharge.

5706.2.5.1 Tanks with top openings only. Tanks with top openings shall be mounted in accordance with either of the following:

1. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit.

2. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height that prevents the tank from contacting the ground.

5706.2.5.1.1 Pumps and fittings. Tanks with top openings only shall be equipped with a tightly and permanently attached, approved pumping device having an approved hose of sufficient length for filling vehicles, equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An effective antisiphoning device shall be included in the pump discharge unless a self-closing nozzle is provided. Siphons or internal pressure discharge devices shall not be used.

5706.2.5.2 Tanks for gravity discharge. Tanks with a connection in the bottom or the end for gravity-dispensing liquids shall be mounted and equipped as follows:

1. Supports to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.
2. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell that will close automatically in the event of fire through the operation of an effective heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve.

The gravity discharge outlet shall be provided with an approved hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

5706.2.6 Spill control drainage control and diking. Indoor storage and dispensing areas shall be provided with spill control and drainage control as set forth in Section 5703.4. Outdoor storage areas shall be provided with drainage control or diking as set forth in Section 5704.2.10.

5706.2.7 Portable fire extinguishers. Portable fire extinguishers with a minimum rating of 20-B:C and complying with Section 906 shall be provided where required by the fire code official.

5706.2.8 Dispensing from tank vehicles. Where approved, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided that:

1. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks.
2. The dispensing hose does not exceed 100 feet (30 480 mm) in length.
3. The dispensing nozzle is an approved type.
4. The dispensing hose is properly placed on an approved reel or in a compartment provided before the tank vehicle is moved.
5. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle.
6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with *the California Electrical Code.*
7. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels.
8. Provisions are made for controlling and mitigating unauthorized discharges.

5706.2.8.1 Location. Dispensing from tank vehicles shall be conducted not less than 50 feet (15 240 mm) from structures or combustible storage.

5706.3 Well drilling and operating. Wells for oil and natural gas shall be drilled and operated in accordance with Sections 5706.3.1 through 5706.3.8.

5706.3.1 Location. The location of wells shall comply with Sections 5706.3.1.1 through 5706.3.1.3.2.

5706.3.1.1 Storage tanks and sources of ignition. Storage tanks or boilers, fired heaters, open-flame devices or other sources of ignition shall not be located within 25 feet (7620 mm) of well heads. Smoking is prohibited at wells or tank locations except as designated and in approved posted areas.

Exception: Engines used in the drilling, production and serving of wells.

5706.3.1.2 Streets and railways. Wells shall not be drilled within 75 feet (22 860 mm) of any dedicated public street, highway or nearest rail of an operating railway.

5706.3.1.3 Buildings. Wells shall not be drilled within 100 feet (30 480 mm) of buildings not necessary to the operation of the well.

5706.3.1.3.1 Group A, E or I buildings. Wells shall not be drilled within 300 feet (91 440 mm) of buildings with an occupancy in Group A, E or I.

5706.3.1.3.2 Existing wells. Where wells are existing, buildings shall not be constructed within the distances set forth in Section 5706.3.1 for separation of wells or buildings.

5706.3.2 Waste control. Control of waste materials associated with wells shall comply with Sections 5706.3.2.1 and 5706.3.2.2.

5706.3.2.1 Discharge on a street or water channel. Liquids containing crude petroleum or its products shall not be discharged into or on streets, highways, drainage canals or ditches, storm drains or flood control channels.

5706.3.2.2 Discharge and combustible materials on ground. The surface of the ground under, around or near wells, pumps, boilers, oil storage tanks or buildings shall be kept free from oil, waste oil, refuse or waste material.

5706.3.3 Sumps. Sumps associated with wells shall comply with Sections 5706.3.3.1 through 5706.3.3.3.

5706.3.3.1 Maximum width. Sumps or other basins for the retention of oil or petroleum products shall not exceed 12 feet (3658 mm) in width.

5706.3.3.2 Backfilling. Sumps or other basins for the retention of oil or petroleum products larger than 6 feet by 6 feet by 6 feet (1829 mm by 1829 mm by 1829 mm) shall not be maintained longer than 60 days after the cessation of drilling operations.

5706.3.3.3 Security. Sumps, diversion ditches and depressions used as sumps shall be securely fenced or covered.

5706.3.4 Prevention of blowouts. Protection shall be provided to control and prevent the blowout of a well. Protection equipment shall meet federal, state and other applicable jurisdiction requirements.

5706.3.5 Storage tanks. Storage of flammable or combustible liquids in tanks shall be in accordance with Section 5704. Oil storage tanks or groups of tanks shall have posted in a conspicuous place, on or near such tank or tanks, an approved sign with the name of the owner or operator, or the lease number and the telephone number where a responsible person can be reached at any time.

5706.3.6 Soundproofing. Where soundproofing material is required during oil field operations, such material shall be noncombustible.

5706.3.7 Signs. Well locations shall have posted in a conspicuous place on or near such tank or tanks an approved sign with the name of the owner or operator, name of the leasee or the lease number, the well number and the telephone number where a responsible person can be reached at any time. Such signs shall be maintained on the premises from the time materials are delivered for drilling purposes until the well is abandoned.

5706.3.8 Field-loading racks. Field-loading racks shall be in accordance with Section 5706.5.

5706.4 Bulk plants or terminals. Portions of properties where flammable and combustible liquids are received by tank vessels, pipelines, tank cars or tank vehicles and stored or blended in bulk for the purpose of distribution by tank vessels, pipelines, tanks cars, tank vehicles or containers shall be in accordance with Sections 5706.4.1 through 5706.4.10.4.

5706.4.1 Building construction. Buildings shall be constructed in accordance with the *California Building Code*.

5706.4.2 Means of egress. Rooms in which liquids are stored, used or transferred by pumps shall have means of egress arranged to prevent occupants from being trapped in the event of fire.

5706.4.3 Heating. Rooms in which Class I liquids are stored or used shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

5706.4.4 Ventilation. Ventilation shall be provided for rooms, buildings and enclosures in which Class I liquids are pumped, used or transferred. Design of ventilation systems shall consider the relatively high specific gravity of the vapors. Where natural ventilation is used, adequate openings in outside walls at floor level, unobstructed except by louvers or coarse screens, shall be provided. Where natural ventilation is inadequate, mechanical ventilation shall be provided in accordance with the *California Mechanical Code*.

5706.4.4.1 Basements and pits. Class I liquids shall not be stored or used within a building having a basement or pit into which flammable vapors can travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

5706.4.4.2 Dispensing of Class I liquids. Containers of Class I liquids shall not be drawn from or filled within buildings unless a provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable vapors could be present.

5706.4.5 Storage. Storage of Class I, II and IIIA liquids in bulk plants shall be in accordance with the applicable provisions of Section 5704.

5706.4.6 Overfill protection of Class I and II liquids. Manual and automatic systems shall be provided to prevent overfill during the transfer of Class I and II liquids from mainline pipelines and marine vessels in accordance with API 2350.

5706.4.7 Wharves. This section shall apply to all wharves, piers, bulkheads and other structures over or contiguous to navigable water having a primary function of transferring liquid cargo in bulk between shore installations and tank vessels, ships, barges, lighter boats or other mobile floating craft.

Exception: Marine motor fuel-dispensing facilities in accordance with Chapter 23.

5706.4.7.1 Transferring approvals. Handling packaged cargo of liquids, including full and empty drums, bulk fuel and stores, over a wharf during cargo transfer shall be subject to the approval of the wharf supervisor and the senior deck officer on duty.

5706.4.7.2 Transferring location. Wharves at which liquid cargoes are to be transferred in bulk quantities to or from tank vessels shall be not less than 100 feet (30 480 mm) from any bridge over a navigable waterway; or from an entrance to, or superstructure of, any vehicular or railroad tunnel under a waterway. The termination of the fixed piping used for loading or unloading at a wharf shall be not less than 200 feet (60 960 mm) from a bridge or from an entrance to, or superstructures of, a tunnel.

5706.4.7.3 Superstructure and decking material. Superstructure and decking shall be designed for the intended use. Decking shall be constructed of materials that will afford the desired combination of flexibility, resistance to shock, durability, strength and fire resistance.

5706.4.7.4 Tanks allowed. Tanks used exclusively for ballast water or Class II or III liquids are allowed to be installed on suitably designed wharves.

5706.4.7.5 Transferring equipment. Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with bypasses, relief valves or other arrangements to protect the loading facilities against excessive pressure. Relief devices shall be tested not less than annually to determine that they function satisfactorily at their set pressure.

5706.4.7.6 Piping, valves and fittings. Piping valves and fittings shall be in accordance with Section 5703.6 except as modified by the following:

1. Flexibility of piping shall be ensured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides or the mooring of vessels will not subject the pipe to repeated excessive strain.
2. Pipe joints that depend on the friction characteristics of combustible materials or on the grooving of pipe ends for mechanical continuity of piping shall not be used.
3. Swivel joints are allowed in piping to which hoses are connected and for articulated, swivel-joint transfer systems, provided that the design is such that the mechanical strength of the joint will not be impaired if the packing materials fail such as by exposure to fire.
4. Each line conveying Class I or II liquids leading to a wharf shall be provided with a block valve that has *ready access* and that is on shore, near the approach to the wharf and outside of any diked area. Where more than one line is involved, the valves shall be grouped in one location.
5. Means shall be provided for easy access to cargo line valves located below the wharf deck.
6. Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.
7. Piping on wharves shall be bonded and grounded where Class I and II liquids are transported. Where excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on piping shall be located on the wharf side of hose riser insulating flanges, where used, and shall be in a location provided with *ready access* for inspection.
8. Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent surge of the vessel from placing stress on the cargo transfer system.
9. Hoses shall be supported to avoid kinking and damage from chafing.

5706.4.7.7 Loading and unloading. Loading or discharging shall not commence until the wharf superintendent and officer in charge of the tank vessel agree that the tank vessel is properly moored and connections are properly made.

5706.4.7.8 Mechanical work. Mechanical work shall not be performed on the wharf during cargo transfer, except under special authorization by the fire code official based on a review of the area involved, methods to be employed and precautions necessary.

5706.4.8 Sources of ignition. Class I, II or IIIA liquids shall not be used, drawn or dispensed where flammable vapors can reach a source of ignition. Smoking shall be prohibited except in designated locations. “No Smoking” signs complying with Section 310 shall be conspicuously posted where a hazard from flammable vapors is normally present.

5706.4.9 Drainage control. Loading and unloading areas shall be provided with drainage control in accordance with Section 5704.2.10.

5706.4.10 Fire protection. Fire protection shall be in accordance with Chapter 9 and Sections 5706.4.10.1 through 5706.4.10.4.

5706.4.10.1 Portable fire extinguishers. Portable fire extinguishers with a rating of not less than 20-B and complying with Section 906 shall be located within 75 feet (22 860 mm) of hose connections, pumps and separator tanks.

5706.4.10.2 Fire hoses. Where piped water is available, ready-connected fire hose in a size appropriate for the water supply shall be provided in accordance with Section 905 so that manifolds where connections are made and broken can be reached by not less than one hose stream.

5706.4.10.3 Obstruction of equipment. Material shall not be placed on wharves in such a manner that would obstruct access to firefighting equipment or important pipeline control valves.

5706.4.10.4 Fire apparatus access. Where the wharf is designed for vehicular traffic, an unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with Chapter 5.

5706.5 Bulk transfer and process transfer operations. Bulk transfer and process transfer operations shall be approved and be in accordance with Sections 5706.5.1 through 5706.5.3.3. Motor fuel-dispensing facilities shall comply with Chapter 23.

5706.5.1 General. The provisions of Sections 5706.5.1.1 through 5706.5.1.18 shall apply to bulk transfer and process transfer operations; Sections 5706.5.2 and 5706.5.2.1 shall apply to bulk transfer operations; Sections 5706.5.3 through 5706.5.3.3 shall apply to process transfer operations and Sections 5706.5.4 through 5706.5.4.5 shall apply to dispensing from tank vehicles and tank cars.

5706.5.1.1 Location. Bulk transfer and process transfer operations shall be conducted in approved locations. Tank cars shall be unloaded only on private sidings or railroad-siding facilities equipped for transferring flammable or combustible liquids.

Tank vehicles and tank cars engaged in bulk transfer or process transfer operations shall be separated from buildings, above-ground tanks, combustible materials, lot lines, public streets, public alleys or public ways by a distance of 25 feet (7620 mm) for Class I liquids and 15 feet (4572 mm) for Class II and IIIA liquids measured from the nearest loading or unloading valve on the tank vehicle or tank car.

Exception: Buildings for pumps and shelters for personnel supporting transfer operations shall not be required to be separated from tank vehicles and tank cars engaged in bulk transfer or process transfer operations.

5706.5.1.2 Weather protection canopies. Where weather protection canopies are provided, they shall be constructed in accordance with Section 5004.13. Weather protection canopies shall not be located within 15 feet (4572 mm) of a building or combustible material or within 25 feet (7620 mm) of building openings, lot lines, public streets, public alleys or public ways.

5706.5.1.3 Ventilation. Ventilation shall be provided to prevent accumulation of vapors in accordance with Section 5705.3.7.5.1.

5706.5.1.4 Sources of ignition. Sources of ignition shall be controlled or eliminated in accordance with Section 5003.7.

5706.5.1.5 Spill control and secondary containment. Areas where transfer operations are located shall be provided with spill control and secondary containment in accordance with Section 5703.4. The spill control and secondary containment system shall have a design capacity capable of containing the capacity of the largest tank compartment located in the area where transfer operations are conducted. Containment of the rainfall volume specified in Section 5004.2.2.6 is not required.

5706.5.1.6 Fire protection. Fire protection shall be in accordance with Section 5703.2.

5706.5.1.7 Static protection. Static protection shall be provided to prevent the accumulation of static charges during transfer operations. Bonding facilities shall be provided during the transfer through open domes where Class I liquids are transferred, or where Class II and III liquids are transferred into tank vehicles or tank cars that could contain vapors from previous cargoes of Class I liquids.

Protection shall consist of a metallic bond wire permanently electrically connected to the fill stem. The fill pipe assembly shall form a continuous electrically conductive path downstream from the point of bonding. The free end of such bond wire shall be provided with a clamp or equivalent device for convenient attachment to a metallic part in electrical contact with the cargo tank of the tank vehicle or tank car. For tank vehicles, protection shall consist of a flexible bond wire of adequate strength for the intended service and the electrical resistance shall not exceed 1 megohm. For tank cars, bonding shall be provided where the resistance of a tank car to ground through the rails is 25 ohms or greater.

Such bonding connection shall be fastened to the vehicle, car or tank before dome covers are raised and shall remain in place until filling is complete and all dome covers have been closed and secured.

Exceptions:

1. Where vehicles and cars are loaded exclusively with products not having a static-accumulating tendency, such as asphalt, cutback asphalt, most crude oils, residual oils and water-miscible liquids.
2. Where Class I liquids are not handled at the transfer facility and the tank vehicles are used exclusively for Class II and III liquids.
3. Where vehicles and cars are loaded or unloaded through closed top or bottom connections whether the hose is conductive or nonconductive.

Filling through open domes into the tanks of tank vehicles or tank cars that contain vapor-air mixtures within the flammable range, or where the liquid being filled can form such a mixture, shall be by means of a downspout that extends to near the bottom of the tank.

5706.5.1.8 Stray current protection. Tank car loading facilities where Class I, II or IIIA liquids are transferred through open domes shall be protected against stray currents by permanently bonding the pipe to not less than one rail and to the transfer apparatus. Multiple pipes entering the transfer areas shall be permanently electrically bonded together. In areas where excessive stray currents are known to exist, all pipes entering the transfer area shall be provided with insulating sections to isolate electrically the transfer apparatus from the pipelines.

5706.5.1.9 Top loading. When top loading a tank vehicle with Class I and II liquids without vapor control, valves used for the final control of flow shall be of the self-closing type and shall be manually held open except where automatic means are provided for shutting off the flow when the tank is full. Where used, automatic shutoff systems shall be provided with a manual shutoff valve located at a safe distance from the loading nozzle to stop the flow if the automatic system fails.

When top loading a tank vehicle with vapor control, flow control shall be in accordance with Section 5706.5.1.10. Self-closing valves shall not be tied or locked in the open position.

5706.5.1.10 Bottom loading. When bottom loading a tank vehicle or tank car with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shutoff control to prevent overfill. The connecting components between the transfer equipment and the tank vehicle or tank car required to operate the secondary control shall be functionally compatible.

5706.5.1.10.1 Dry disconnect coupling. When bottom loading a tank vehicle, the coupling between the liquid loading hose or pipe and the truck piping shall be a dry disconnect coupling.

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5706.5.1.10.2 Venting. When bottom loading a tank vehicle or tank car that is equipped for vapor control and vapor control is not used, the tank shall be vented to the atmosphere to prevent pressurization of the tank. Such venting shall be at a height equal to or greater than the top of the cargo tank.

5706.5.1.10.3 Vapor-tight connection. Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a tank vehicle or tank car.

5706.5.1.10.4 Vapor-processing equipment. Vapor-processing equipment shall be separated from above-ground tanks, warehouses, other plant buildings, transfer facilities or nearest lot line of adjoining property that can be built on by a distance of not less than 25 feet (7620 mm). Vapor-processing equipment shall be protected from physical damage by remote location, guard rails, curbs or fencing.

5706.5.1.11 Switch loading. Tank vehicles or tank cars that have previously contained Class I liquids shall not be loaded with Class II or III liquids until such vehicles and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

Exception: *When approved by the Enforcing Agency, the procedures prescribed in API (API-RP-2003) Recommended Practices 2003 entitled "Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents" may be used for changing tank contents.*

5706.5.1.12 Loading racks. Where provided, loading racks, stairways or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack. Wiring and electrical equipment located within 25 feet (7620 mm) of any portion of the loading rack shall be in accordance with Section 5703.1.1.

5706.5.1.13 Transfer apparatus. Bulk and process transfer apparatus shall be of an approved type.

5706.5.1.14 Inside buildings. Tank vehicles and tank cars shall not be located inside a building while transferring Class I, II or IIIA liquids, unless approved by the fire code official.

Exception: Tank vehicles are allowed under weather protection canopies and canopies of automobile motor vehicle fuel-dispensing stations.

5706.5.1.15 Tank vehicle and tank car certification. Certification shall be maintained for tank vehicles and tank cars in accordance with DOTn 49 CFR Parts 100–185.

5706.5.1.16 Tank vehicle and tank car stability. Tank vehicles and tank cars shall be stabilized against movement during loading and unloading in accordance with Sections 5706.5.1.16.1 through 5706.5.1.16.3.

5706.5.1.16.1 Tank vehicles. When the vehicle is parked for loading or unloading, the cargo trailer portion of the tank vehicle shall be secured in a manner that will prevent unintentional movement.

5706.5.1.16.2 Chock blocks. Not less than two chock blocks not less than 5 inches by 5 inches by 12 inches (127 mm by 127 mm by 305 mm) in size and dished to fit the contour of the tires shall be used during transfer operations of tank vehicles.

5706.5.1.16.3 Tank cars. Brakes shall be set and the wheels shall be blocked to prevent rolling.

5706.5.1.17 Monitoring. Transfer operations shall be monitored by an approved monitoring system or by an attendant. Where monitoring is by an attendant, the operator or other competent person shall be present at all times.

5706.5.1.18 Security. Transfer operations shall be surrounded by a noncombustible fence not less than 5 feet (1524 mm) in height. Tank vehicles and tank cars shall not be loaded or unloaded unless such vehicles are entirely within the fenced area.

Exceptions:

1. Motor fuel-dispensing facilities complying with Chapter 23.
2. Installations where adequate public safety exists because of isolation, natural barriers or other factors as determined appropriate by the fire code official.
3. Facilities or properties that are entirely enclosed or protected from entry.

5706.5.2 Bulk transfer. Bulk transfer shall be in accordance with Sections 5706.5.1 and 5706.5.2.1.

5706.5.2.1 Vehicle motor. Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: Where unloading is performed with a pump deriving its power from the tank vehicle motor.

5706.5.3 Process transfer. Process transfer shall be in accordance with Section 5706.5.1 and Sections 5706.5.3.1 through 5706.5.3.3.

5706.5.3.1 Piping, valves, hoses and fittings. Piping, valves, hoses and fittings that are not a part of the tank vehicle or tank car shall be in accordance with Section 5703.6. Caps or plugs that prevent leakage or spillage shall be provided at all points of connection to transfer piping.

5706.5.3.1.1 Shutoff valves. Approved automatically or manually activated shutoff valves shall be provided where the transfer hose connects to the process piping, and on both sides of any exterior fire-resistance-rated wall through which the piping passes. Manual shutoff valves shall be arranged so that they are able to be accessed from grade. Valves shall not be locked in the open position.

5706.5.3.1.2 Hydrostatic relief. Hydrostatic pressure-limiting or relief devices shall be provided where pressure buildup in trapped sections of the system could exceed the design pressure of the components of the system.

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Devices shall relieve to other portions of the system or to another approved location.

5706.5.3.1.3 Antisiphon valves. Antisiphon valves shall be provided where the system design would allow siphonage.

5706.5.3.2 Vents. Normal and emergency vents shall be maintained operable at all times.

5706.5.3.3 Motive power. Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: When unloading is performed with a pump deriving its power from the tank vehicle motor.

5706.5.4 Dispensing from tank vehicles and tank cars. Dispensing from tank cars into the fuel tanks of motor vehicles shall be prohibited. Dispensing from tank vehicles into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 5706.5.4.1 through 5706.5.4.5.

5706.5.4.1 Marine craft and special equipment. Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment where approved by the fire code official, and where:

1. The tank vehicle's specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.
3. The dispensing line does not exceed 50 feet (15 240 mm) in length.
4. The dispensing nozzle is approved.
5. The operation shall be in accordance with Sections 2310.4.1 and 2310.4.2.

5706.5.4.2 Emergency refueling. Where approved by the fire code official, dispensing of motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles is allowed during emergencies. Dispensing from tank vehicles shall be in accordance with Sections 5706.2.8 and 5706.6.

5706.5.4.3 Aircraft fueling. Transfer of liquids from tank vehicles to the fuel tanks of aircraft shall be in accordance with Chapter 20.

5706.5.4.4 Fueling of vehicles at farms, construction sites and similar areas. Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed in accordance with Section 5706.2.8.

5706.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class I, II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where approved, provided that such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The owner of a mobile fueling operation shall provide to the jurisdiction a written response plan that demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the lot lines of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained on the site property; and the scale of the site plan.

   Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other approved means.
4. The fire code official is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
5. Mobile fueling operations shall be conducted in areas not open to the public or shall be limited to times when the public is not present.
6. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

   Exceptions:

   1. The distance to storm drains shall not apply where an approved storm drain cover or an approved equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.
   2. The distance to storm drains shall not apply for drains that direct influent to approved oil interceptors.
7. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
8. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
9. A portable fire extinguisher with a minimum rating of 40:BC shall be provided on the vehicle with signage clearly indicating its location.

10. The dispensing nozzles and hoses shall be of an approved and listed type.
11. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an approved container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
13. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to not more than 500 gallons (1893 L) before resetting the limit switch.

    Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device that, when activated, immediately causes flow of fuel from the tank vehicle to cease.
14. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak or spill. Training records shall be maintained by the dispensing company.
15. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
16. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
17. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
18. The engines of vehicles being fueled shall be shut off during dispensing operations.
19. Nighttime fueling operations shall only take place in adequately lighted areas.
20. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
21. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
22. Motor vehicle fuel tanks shall not be topped off.
23. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the tank vehicle.
24. The fire code official and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
25. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel fuel overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

5706.6 Tank vehicles and vehicle operation. Tank vehicles shall be designed, constructed, equipped and maintained in accordance with NFPA 385 and Sections 5706.6.1 through 5706.6.4.

5706.6.1 Operation of tank vehicles. Tank vehicles shall be utilized and operated in accordance with NFPA 385 and Sections 5706.6.1.1 through 5706.6.1.11.

5706.6.1.1 Vehicle maintenance. Tank vehicles shall not be operated unless they are in proper state of repair and free from accumulation of grease, oil or other flammable substance, and leaks.

5706.6.1.2 Leaving vehicle unattended. The driver, operator or attendant of a tank vehicle shall not remain in the vehicle cab and shall not leave the vehicle while it is being filled or discharged. The delivery hose, when attached to a tank vehicle, shall be considered to be a part of the tank vehicle.

5706.6.1.3 Vehicle motor shutdown. Motors of tank vehicles or tractors shall be shut down during the making or breaking of hose connections. If loading or unloading is performed without the use of a power pump, the tank vehicle or tractor motor shall be shut down throughout such operations.

5706.6.1.4 Outage. A cargo tank or compartment thereof used for the transportation of flammable or combustible liquids shall not be loaded to absolute capacity. The vacant space in a cargo tank or compartment thereof used in the transportation of flammable or combustible liquids shall be not less than 1 percent. Sufficient space shall be left vacant to prevent leakage from or distortion of such tank or compartment by expansion of the contents caused by rise in temperature in transit.

5706.6.1.5 Overfill protection. The driver, operator or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled capacity of such tank by a suitable gauging device. To prevent overfilling, the driver, operator or attendant shall not deliver in excess of that amount.

5706.6.1.6 Securing hatches. During loading, hatch covers shall be secured on all but the receiving compartment.

5706.6.1.7 Liquid temperature. Materials shall not be loaded into or transported in a tank vehicle at a temperature above the material's ignition temperature unless safeguarded in an approved manner.

5706.6.1.8 Bonding to underground tanks. An external bond-wire connection or bond-wire integral with a hose shall be provided for the transferring of flammable liquids through open connections into underground tanks.

5706.6.1.9 Smoking. Smoking by tank vehicle drivers, helpers or other personnel is prohibited while they are driving, making deliveries, filling or making repairs to tank vehicles.

5706.6.1.10 Hose connections. Delivery of flammable liquids to underground tanks with a capacity of more than 1,000 gallons (3785 L) shall be made by means of approved liquid and vapor-tight connections between the delivery hose and tank fill pipe. Where underground tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

5706.6.1.10.1 Simultaneous delivery. Simultaneous delivery to underground tanks of any capacity from two or more discharge hoses shall be made by means of mechanically tight connections between the hose and fill pipe.

5706.6.1.11 Hose protection. Upon arrival at a point of delivery and prior to discharging any flammable or combustible liquids into underground tanks, the driver, operator or attendant of the tank vehicle shall ensure that all hoses utilized for liquid delivery and vapor recovery, where required, will be protected from physical damage by motor vehicles. Such protection shall be provided by positioning the tank vehicle to prevent motor vehicles from passing through the area or areas occupied by hoses, or by other approved equivalent means.

5706.6.2 Parking. Parking of tank vehicles shall be in accordance with Sections 5706.6.2.1 through 5706.6.2.3.

Exception: In cases of accident, breakdown or other emergencies, tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

5706.6.2.1 Parking near residential, educational and institutional occupancies and other high-risk areas. Tank vehicles shall not be left unattended at any time on residential streets, or within 500 feet (152 m) of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Tank vehicles shall not be left unattended at any other place that would, in the opinion of the fire chief, pose an extreme life hazard.

5706.6.2.2 Parking on thoroughfares. Tank vehicles shall not be left unattended on a public street, highway, public avenue or public alley.

Exceptions:

1. The necessary absence in connection with loading or unloading the vehicle. During actual fuel transfer, Section 5706.6.1.2 shall apply. The vehicle location shall be in accordance with Section 5706.6.2.1.
2. Stops for meals during the day or night, where the street is well lighted at the point of parking. The vehicle location shall be in accordance with Section 5706.6.2.1.

5706.6.2.3 Duration exceeding 1 hour. Tank vehicles parked at one point for longer than 1 hour shall be located off of public streets, highways, public avenues or alleys, and in accordance with either of the following:

1. Inside of a bulk plant and either 25 feet (7620 mm) or more from the nearest lot line or within a building approved for such use.
2. At other approved locations not less than 50 feet (15 240 mm) from the buildings other than those approved for the storage or servicing of such vehicles.

5706.6.3 Garaging. Tank vehicles shall not be parked or garaged in buildings other than those specifically approved for such use by the fire code official.

5706.6.4 Portable fire extinguisher. Tank vehicles shall be equipped with a portable fire extinguisher complying with Section 906 and having a minimum rating of 2-A:20-B:C.

During unloading of the tank vehicle, the portable fire extinguisher shall be out of the carrying device on the vehicle and shall be 15 feet (4572 mm) or more from the unloading valves.

5706.7 Refineries. Plants and portions of plants in which flammable liquids are produced on a scale from crude petroleum, natural gasoline or other hydrocarbon sources shall be in accordance with Sections 5706.7.1 through 5706.7.3. Petroleum-processing plants and facilities or portions of plants or facilities in which flammable or combustible liquids are handled, treated or produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources shall also be in accordance with API 651, API 653, API 752, API 1615, API 2001, API 2003, API 2009, API 2015, API 2023, API 2201 and API 2350.

5706.7.1 Corrosion protection. Above-ground tanks and piping systems shall be protected against corrosion in accordance with API 651.

5706.7.2 Cleaning of tanks. The safe entry and cleaning of petroleum storage tanks shall be conducted in accordance with API 2015.

5706.7.3 Storage of heated petroleum products. Where petroleum-derived asphalts and residues are stored in heated tanks at refineries and bulk storage facilities or in tank vehicles, such products shall be in accordance with API 2023.

5706.8 Vapor recovery and vapor-processing systems. Vapor-processing systems in which the vapor source operates at pressures from vacuum, up to and including 1 psig (6.9 kPa) or in which a potential exists for vapor mixtures in the flammable range, shall comply with Sections 5706.8.1 through 5706.8.5.

Exceptions:

1. Marine systems complying with federal transportation waterway regulations such as DOTn 33 CFR Parts 154 through 156, and CGR 46 CFR Parts 30, 32, 35 and 39.

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2. Motor fuel-dispensing facility systems complying with Chapter 23.

5706.8.1 Over-pressure/vacuum protection. Tanks and equipment shall have independent venting for over-pressure or vacuum conditions that might occur from malfunction of the vapor recovery or processing system.

Exception: For tanks, venting shall comply with Section 5704.2.7.3.

5706.8.2 Vent location. Vents on vapor-processing equipment shall be not less than 12 feet (3658 mm) from adjacent ground level, with outlets located and directed so that flammable vapors will disperse to below the lower flammable limit (LFL) before reaching locations containing potential ignition sources.

5706.8.3 Vapor collection systems and overfill protection. The design and operation of the vapor collection system and overfill protection shall be in accordance with this section and Section 19.5 of NFPA 30.

5706.8.4 Liquid-level monitoring. A liquid knock-out vessel used in the vapor collection system shall have means to verify the liquid level and a high-liquid-level sensor that activates an alarm. For unpopulated facilities, the high-liquid-level sensor shall initiate the shutdown of liquid transfer into the vessel and shutdown of vapor recovery or vapor-processing systems.

5706.8.5 Overfill protection. Storage tanks served by vapor recovery or processing systems shall be equipped with overfill protection in accordance with Section 5704.2.7.5.8.

SECTION 5707—ON-DEMAND MOBILE FUELING OPERATIONS

5707.1 General. On-demand mobile fueling operations that dispense Class I, II and III liquids into the fuel tanks of motor vehicles shall comply with Sections 5707.1 through 5707.6.6.

Exception: Fueling from an approved portable container in cases of an emergency or for personal use.

5707.1.1 Approval required. Mobile fueling operations shall not be conducted without first obtaining an operational permit in accordance with Section 105.5.18.

5707.1.2 Location. Mobile fueling operations shall occur only at approved locations. The fire code official is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

5707.2 Mobile fueling vehicle. An on-demand mobile fueling vehicle shall be that which is utilized in on-demand fueling operations for the dispensing of Class I, II or III liquids into the fuel tanks of motor vehicles.

5707.2.1 Mobile fueling vehicle classifications. An on-demand mobile fueling vehicle shall be characterized as one of the following:

1. **Tier 1 mobile fueling vehicle.** A tank vehicle that complies with NFPA 385 and that has chassis-mounted tanks where the aggregate capacity does not exceed 1,600 gallons (6057 L).
2. **Tier 2 mobile fueling vehicle.** A vehicle with one or more chassis-mounted tanks or containers that do not exceed 110 gallons (416 L) in capacity with an aggregate capacity that does not exceed 800 gallons (3028 L) or the weight capacity of the vehicle in accordance with DOTn.
3. **Tier 3 mobile fueling vehicle.** A vehicle that carries a maximum aggregate capacity of 60 gallons (227 L) of motor fuel in metal safety cans listed in accordance with UL 30 or other approved metal containers, each not to exceed 5 gallons (19 L) in capacity.

5707.2.2 Mobile fueling vehicle requirements. Each mobile fueling vehicle shall comply with all local, state and federal requirements, as well as the following:

1. Mobile fueling vehicles with a chassis-mounted tank in excess of 110 gallons (416 L) shall also comply with the requirements of Section 5706.6 and NFPA 385.
2. The mobile fueling vehicle and its equipment shall be maintained in good repair.
3. Safety cans and approved metal containers shall be secured to the mobile fueling vehicle except when in use.
4. Fueling a motor vehicle from tanks or containers mounted in a trailer connected to a mobile fueling vehicle shall be prohibited.

5707.3 Required documents. Documents developed to comply with Sections 5707.3.1 through 5707.3.3 shall be updated as necessary by the owner of the mobile fueling operation and shall be maintained in compliance with Section 110.3.

5707.3.1 Safety and emergency response plan. Mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, spill prevention and control, personnel training and compliance with other applicable requirements of this code.

5707.3.2 Training records. Mobile fueling vehicles shall be operated only by designated personnel who are trained on proper fueling procedures and the safety and emergency response plan. Training records of operators shall be maintained.

5707.3.3 Site plan. Where required by the fire code official, a site plan shall be developed for each location or area at which mobile fueling occurs. The site plan shall be in sufficient detail to indicate the following:

1. All buildings and structures.
2. Lot lines or property lines.
3. Electric car chargers.
4. Solar photovoltaic parking lot canopies.

5. Appurtenances on-site and their use or function.
6. All uses adjacent to the lot lines of the site.
7. Fueling locations.
8. Locations of all storm drain openings and adjacent waterways or wetlands.
9. Information regarding slope, natural drainage, curbing and impounding.
10. How a spill will be kept on the site property.
11. Scale of the site plan.

5707.4 Mobile fueling areas. During fueling, the mobile fueling vehicle and point of connection to the vehicle shall not be located on public streets, public ways or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited.

5707.4.1 Separation. During fueling, the point of connection to the vehicle being fueled shall not take place within 25 feet (7620 mm) of buildings, lot lines, property lines or combustible storage. Mobile fueling vehicles shall not park within 10 feet (3048 mm) of buildings, lot lines, property lines or combustible storage.

Exceptions:

1. The fire code official shall be authorized to decrease the separation distance for dispensing from metal safety cans or other approved metal containers in accordance with Section 5707.2.
2. The point of fueling shall not take place within 10 feet (3048 mm) of buildings, lot lines, property lines or combustible storage where the mobile fueling vehicle has an approved vapor recovery system or is servicing vehicles with onboard refueling vapor recovery.

Where dispensing operations occur within 15 feet (4572 mm) of a storm drain, an approved storm drain cover or an approved equivalent method that will prevent any fuel from reaching the drain shall be used.

5707.4.2 Sources of ignition. Smoking, open flames and other sources of ignition shall be prohibited within 25 feet (7620 mm) of fuel dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the mobile fueling vehicle. The engines of vehicles being fueled shall be shut off during fueling.

5707.4.3 Electrical equipment. Mobile fueling shall not occur within 20 feet (6096 mm) of electrical equipment located within 18 inches (457 mm) of the ground unless such electrical equipment is rated for Class I, Division 2, hazardous locations in accordance with *the California Electrical Code.*

5707.5 Equipment. Mobile fueling equipment shall comply with Sections 5707.5.1 through 5707.5.5.

5707.5.1 Dispensing hoses and nozzles. Where equipped, the dispensing hose shall not exceed 50 feet (15 240 mm) in length. The dispensing nozzles and hoses shall be of an approved and listed type. Where metal-to-metal contact cannot be made between the nozzle and the fuel fill opening, a means for bonding the mobile fueling vehicle to the motor vehicle shall be provided and employed during fueling operations.

5707.5.2 Breakaway device. A listed breakaway device shall be provided at the nozzle.

Exception: Mobile fueling vehicles equipped with an approved brake interlock tied to the nozzle holder that prohibits movement of the mobile fueling vehicle when the nozzle is removed from its holder or tied to the delivery of fuel that prevents activation of the pumping system.

5707.5.3 Shutoff valve and fuel limit. Mobile fueling vehicles shall be equipped with a listed shutoff valve assembly and a fuel limit switch set to a maximum of 30 gallons (116 L).

5707.5.4 Fire extinguisher. An approved portable fire extinguisher complying with Section 906 with a minimum rating of4-A:80-B:C shall be provided on the mobile fueling vehicle with signage clearly indicating its location.

5707.5.5 Spill kit. Mobile fueling vehicles shall contain a minimum 5-gallon (19 L) spill kit of an approved type.

5707.6 Operations. Mobile fueling vehicles shall be constantly attended during fueling operations with brakes set and warning lights in operation. Mobile fueling vehicles shall not obstruct emergency vehicle access roads.

5707.6.1 Dispensing hose. Where equipped, mobile fueling vehicles shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the mobile fueling vehicle.

5707.6.2 Drip control. Operators shall place a drip pan or an absorbent pillow under the nozzle and each fuel fill opening prior to and during dispensing operations to catch drips.

5707.6.3 Safety cones. Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

5707.6.4 Vehicle lights. The mobile fueling vehicle flasher lights shall be in operation while dispensing operations are in progress.

5707.6.5 Nighttime deliveries. Nighttime deliveries shall be made only in areas deemed adequately lighted by the fire code official.

5707.6.6 Spill reporting. Spills shall be reported in accordance with Section 5003.3.1.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 58 – FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
5801.1			X																				
5809.1			X																				
5809.2.1			X																				
5809.3			X																				
5809.3.1			X																				
5809.3.2			X																				
5809.3.3			X																				
5809.4			X																				
5809.4.1 – 5809.4.2			X																				
5809.5.1			X																				
5809.5.1.1			X																				
5809.5.1.2			X																				
5809.6.1.1			X																				
5809.6.1.2			X																				
5809.6.3			X																				
5809.6.5.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

58

FLAMMABLE GASES AND FLAMMABLE CRYOGENIC FLUIDS

User notes:

About this chapter: Chapter 58 sets requirements for the storage and use of flammable gases. For safety purposes, there is a limit on the quantities of flammable gas allowed per control area. Exceeding these limitations increases the possibility of damage to both property and individuals. The principal hazard posed by flammable gas is its ready ignitability, or even explosivity, when mixed with air in the proper proportions. Consequently, occupancies storing or handling large quantities of flammable gas are classified as Group H-2 (high hazard) by the *California Building Code*.

SECTION 5801—GENERAL

5801.1 Scope. The storage and use of flammable gases and flammable cryogenic fluids shall be in accordance with this chapter, NFPA 2 and NFPA 55. Compressed gases shall also comply with Chapter 53 and cryogenic fluids shall also comply with Chapter 55. Flammable cryogenic fluids shall comply with Section 5806. Hydrogen motor fuel-dispensing stations and repair garages and their associated above-ground hydrogen storage systems shall also be designed, constructed and maintained in accordance with Chapter 23. *Mobile fueling of hydrogen-fueled vehicles shall comply with Section 5809.*

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 608).
2. Liquefied petroleum gases and natural gases regulated by Chapter 61.
3. Fuel-gas systems and appliances regulated under the *California Mechanical Code and the California Plumbing Code* other than gaseous hydrogen systems and appliances.
4. Pyrophoric gases in accordance with Chapter 64.

5801.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 5802—DEFINITIONS

5802.1 Definitions. The following terms are defined in Chapter 2:

FLAMMABLE GAS.

FLAMMABLE LIQUEFIED GAS.

GAS DETECTION SYSTEM.

GASEOUS HYDROGEN SYSTEM.

HYDROGEN FUEL GAS ROOM.

METAL HYDRIDE.

METAL HYDRIDE STORAGE SYSTEM.

SECTION 5803—GENERAL REQUIREMENTS

5803.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of flammable gases in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 5801 and 5803.

5803.1.1 Special limitations for indoor storage and use. Flammable gases shall not be stored or used in Group A, E, I or R occupancies or in offices in Group B occupancies.

Exceptions:

1. Cylinders of nonliquefied compressed gases not exceeding a capacity of 250 cubic feet (7.08 m^3) or liquefied gases not exceeding a capacity of 40 pounds (18 kg) each at normal temperature and pressure (NTP) used for maintenance purposes, patient care or operation of equipment.
2. Food service operations in accordance with Section 6103.2.1.7.
3. Hydrogen gas systems located in a hydrogen fuel gas room constructed in accordance with Section 421 of the *California Building Code*.

5803.1.1.1 Medical gases. Medical gas system supply cylinders shall be located in medical gas storage rooms or gas cabinets as set forth in Section 5306.

5803.1.1.2 Aggregate quantity. The aggregate quantities of flammable gases used for maintenance purposes and operation of equipment shall not exceed the maximum allowable quantity per control area indicated in Table 5003.1.1(1).

5803.1.2 Storage containers. Cylinders and pressure vessels for flammable gases shall be designed, constructed, installed, tested and maintained in accordance with Chapter 53.

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5803.1.3 Emergency shutoff. Compressed gas systems conveying flammable gases shall be provided with approved manual or automatic emergency shutoff valves that can be activated at each point of use and at each source.

5803.1.3.1 Shutoff at source. A manual or automatic fail-safe emergency shutoff valve shall be installed on supply piping at the cylinder or bulk source. Manual or automatic cylinder valves are allowed to be used as the required emergency shutoff valve where the source of supply is limited to unmanifolded cylinder sources.

5803.1.3.2 Shutoff at point of use. A manual or automatic emergency shutoff valve shall be installed on the supply piping at the point of use or at a point where the equipment using the gas is connected to the supply system.

5803.1.4 Ignition source control. Ignition sources in areas containing flammable gases in storage or in use shall be controlled in accordance with Section 5003.7.

Exception: Fuel gas systems connected to building service utilities in accordance with the *International Fuel Gas Code*.

5803.1.4.1 Static-producing equipment. Static-producing equipment located in flammable gas storage areas shall be grounded.

5803.1.4.2 Signs. "No Smoking" signs shall be posted at entrances to rooms and in areas containing flammable gases in accordance with Section 5003.7.1.

5803.1.5 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with Section 603 and *the California Electrical Code.*

5803.1.5.1 Bonding of electrically conductive materials and equipment. Exposed noncurrent-carrying metal parts, including metal gas piping systems, that are part of flammable gas supply systems located in a hazardous (electrically classified) location shall be bonded to a grounded conductor in accordance with the provisions of *the California Electrical Code.*

5803.1.5.2 Static-producing equipment. Static-producing equipment located in flammable gas storage or use areas shall be grounded.

5803.1.6 Liquefied flammable gases and flammable gases in solution. Containers of liquefied flammable gases and flammable gases in solution shall be positioned in the upright position or positioned so that the pressure relief valve is in direct contact with the vapor space of the container.

Exceptions:

1. Containers of flammable gases in solution with a capacity of 1.3 gallons (5 L) or less.
2. Containers of flammable liquefied gases, with a capacity not exceeding 1.3 gallons (5 L), designed to preclude the discharge of liquid from safety relief devices.

5803.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

SECTION 5804—STORAGE

5804.1 Indoor storage. Indoor storage of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1), shall be in accordance with Sections 5001, 5003 and 5004, and this chapter.

5804.1.1 Explosion control. Buildings or portions thereof containing flammable gases shall be provided with explosion control in accordance with Section 911.

5804.2 Outdoor storage. Outdoor storage of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003 and 5004, and this chapter.

SECTION 5805—USE

5805.1 General. The use of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003 and 5005, and this chapter.

SECTION 5806—FLAMMABLE CRYOGENIC FLUIDS

5806.1 General. The storage and use of flammable cryogenic fluids shall be in accordance with Sections 5806.2 through 5806.4.8.3 and Chapter 55.

5806.2 Limitations. Storage of flammable cryogenic fluids in stationary containers outside of buildings is prohibited within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction.

5806.3 Above-ground tanks for liquid hydrogen. Above-ground tanks for the storage of liquid hydrogen shall be in accordance with Sections 5806.3.1 through 5806.3.2.1.

5806.3.1 Construction of the inner vessel. The inner vessel of storage tanks in liquid hydrogen service shall be designed and constructed in accordance with Section VIII, Division 1, of the ASME Boiler and Pressure Vessel Code and shall be vacuum jacketed in accordance with Section 5806.3.2.

5806.3.2 Construction of the vacuum jacket (outer vessel). The vacuum jacket used as an outer vessel for storage tanks in liquid hydrogen service shall be of welded steel construction designed to withstand the maximum internal and external pressure to which it will be subjected under operating conditions to include conditions of emergency pressure relief of the annular space

between the inner and outer vessel. The jacket shall be designed to withstand a minimum collapsing pressure differential of 30 psi (207 kPa).

5806.3.2.1 Vacuum-level monitoring. A connection shall be provided on the exterior of the vacuum jacket to allow measurement of the pressure within the annular space between the inner and outer vessel. The connection shall be fitted with a bellows-sealed or diaphragm-type valve equipped with a vacuum gauge tube that is shielded to protect against damage from impact.

5806.4 Underground tanks for liquid hydrogen. Underground tanks for the storage of liquid hydrogen shall be in accordance with Sections 5806.4.1 through 5806.4.8.3.

5806.4.1 Construction. Storage tanks for liquid hydrogen shall be designed and constructed in accordance with ASME *Boiler and Pressure Vessel Code* (Section VIII, Division 1) and shall be vacuum jacketed in accordance with Section 5806.4.8.

5806.4.2 Location. Storage tanks shall be located outside in accordance with the following:

1. Tanks and associated equipment shall be located with respect to foundations and supports of other structures such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of the tank to the nearest wall of a basement, pit, cellar or lot line shall be not less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

5806.4.3 Depth, cover and fill. The tank shall be buried such that the top of the vacuum jacket is covered with not less than 1 foot (305 mm) of earth and with concrete not less than 4 inches (102 mm) thick placed over the earthen cover. The concrete shall extend not less than 1 foot (305 mm) horizontally beyond the footprint of the tank in all directions. Underground tanks shall be set on firm foundations constructed in accordance with the *California Building Code* and surrounded with not less than 6 inches (152 mm) of noncorrosive inert material, such as sand.

Exception: The vertical extension of the vacuum jacket as required for service connections.

5806.4.4 Anchorage and security. Tanks and systems shall be secured against accidental dislodgement in accordance with this chapter.

5806.4.5 Venting of underground tanks. Vent pipes for underground storage tanks shall be in accordance with Section 5503.3.

5806.4.6 Underground liquid hydrogen piping. Underground liquid hydrogen piping shall be vacuum jacketed or protected by approved means and designed in accordance with Chapter 55.

5806.4.7 Overfill protection and prevention systems. An approved means or method shall be provided to prevent the overfill of all storage tanks.

5806.4.8 Vacuum jacket construction. The vacuum jacket shall be designed and constructed in accordance with Section VIII of ASME *Boiler and Pressure Vessel Code* and shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. Portions of the vacuum jacket installed below grade shall be designed to withstand anticipated soil, seismic and hydrostatic loading.

5806.4.8.1 Material. The vacuum jacket shall be constructed of stainless steel or other approved corrosion-resistant material.

5806.4.8.2 Corrosion protection. The vacuum jacket shall be protected by approved or listed corrosion-resistant materials or an engineered cathodic protection system. Where cathodic protection is utilized, an approved maintenance schedule shall be established. Exposed components shall be inspected not less than twice a year. Records of maintenance and inspection events shall be maintained.

5806.4.8.3 Vacuum-level monitoring. An approved method shall be provided to indicate loss of vacuum within the vacuum jacket(s).

SECTION 5807—METAL HYDRIDE STORAGE SYSTEMS

5807.1 General requirements. The storage and use of metal hydride storage systems shall be in accordance with Sections 5801, 5803, 5804, 5805 and 5807. Those portions of the system that are used as a means to store or supply hydrogen shall also comply with Chapters 50 and 53 as applicable.

5807.1.1 Classification. The hazard classification of the metal hydride storage system, as required by Section 5001.2.2, shall be based on the hydrogen stored without regard to the metal hydride content.

5807.1.2 Listed or approved systems. Metal hydride storage systems shall be listed or approved for the application and designed in a manner that prevents the addition or removal of the metal hydride by other than the original equipment manufacturer.

5807.1.3 Containers, design and construction. Compressed gas containers, cylinders and tanks shall be designed and constructed in accordance with Section 5303.2.

5807.1.4 Service life and inspection of containers. Metal hydride storage system cylinders, containers or tanks shall be inspected, tested and requalified for service at not less than 5-year intervals.

5807.1.5 Marking and labeling. Marking and labeling of cylinders, containers, tanks and systems shall be in accordance with Section 5303.4 and Sections 5807.1.5.1 through 5807.1.5.4.

5807.1.5.1 System marking. Metal hydride storage systems shall be marked with all of the following:

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1. Manufacturer's name.
2. Service life indicating the last date the system can be used.
3. A unique code or serial number specific to the unit.
4. System name or product code that identifies the system by the type of chemistry used in the system.
5. Emergency contact name, telephone number or other contact information.
6. Limitations on refilling of containers to include rated charging pressure and capacity.

5807.1.5.2 Valve marking. Metal hydride storage system valves shall be marked with all of the following:

1. Manufacturer's name.
2. Service life indicating the last date the valve can be used.
3. Metal hydride service in which the valve can be used, or a product code that is traceable to this information.

5807.1.5.3 Pressure relief device marking. Metal hydride storage system pressure relief devices shall be marked with all of the following:

1. Manufacturer's name.
2. Metal hydride service in which the device can be used, or a product code that is traceable to this information.
3. Activation parameters to include temperature, pressure or both.

5807.1.5.3.1 Pressure relief devices integral to container valves. The required markings for pressure relief devices that are integral components of valves used on cylinders, containers and tanks shall be allowed to be placed on the valve.

5807.1.5.4 Pressure vessel markings. Cylinders, containers and tanks used in metal hydride storage systems shall be marked with all of the following:

1. Manufacturer's name.
2. Design specification to which the vessel was manufactured.
3. Authorized body approving the design and initial inspection and test of the vessel.
4. Manufacturer's original test date.
5. Unique serial number for the vessel.
6. Service life identifying the last date the vessel can be used.
7. System name or product code that identifies the system by the type of chemistry used in the system.

5807.1.6 Temperature extremes. Metal hydride storage systems, whether full or partially full, shall not be exposed to artificially created high temperatures exceeding 125°F (52°C) or subambient (low) temperatures unless designed for use under the exposed conditions.

5807.1.7 Falling objects. Metal hydride storage systems shall not be placed in areas where they are capable of being damaged by falling objects.

5807.1.8 Piping systems. Piping, including tubing, valves, fittings and pressure regulators, serving metal hydride storage systems, shall be maintained gas tight to prevent leakage.

5807.1.8.1 Leaking systems. Leaking systems shall be removed from service.

5807.1.9 Refilling of containers. The refilling of listed or approved metal hydride storage systems shall be in accordance with the listing requirements and manufacturer's instructions.

5807.1.9.1 Industrial trucks. The refilling of metal hydride storage systems serving powered industrial trucks shall be in accordance with Section 309.

5807.1.9.2 Hydrogen purity. The purity of hydrogen used for the purpose of refilling containers shall be in accordance with the listing and the manufacturer's instructions.

5807.1.10 Electrical. Electrical components for metal hydride storage systems shall be designed, constructed and installed in accordance with *the California Electrical Code.*

5807.2 Portable containers or systems. Portable containers or systems shall comply with Sections 5807.2.1 through 5807.2.2.

5807.2.1 Securing containers. Containers, cylinders and tanks shall be secured in accordance with Section 5303.5.3.

5807.2.1.1 Use on mobile equipment. Where a metal hydride storage system is used on mobile equipment, the equipment shall be designed to restrain containers, cylinders or tanks from dislodgement, slipping or rotating when the equipment is in motion.

5807.2.1.2 Motorized equipment. Metal hydride storage systems used on motorized equipment, shall be installed in a manner that protects valves, pressure regulators, fittings and controls against accidental impact.

5807.2.1.2.1 Protection from damage. Metal hydride storage systems, including cylinders, containers, tanks and fittings, shall not extend beyond the platform of the mobile equipment.

5807.2.2 Valves. Valves on containers, cylinders and tanks shall remain closed except when containers are connected to closed systems and ready for use.

SECTION 5808—HYDROGEN FUEL GAS ROOMS

5808.1 General. Where required by this code, hydrogen fuel gas rooms shall be designed and constructed in accordance with Sections 5808.1 through 5808.7 and the *California Building Code*.

5808.2 Location. Hydrogen fuel gas rooms shall not be located below grade.

5808.3 Design and construction. Hydrogen fuel gas rooms not exceeding the maximum allowable quantity per control area in Table 5003.1.1(1) shall be separated from other areas of the building in accordance with Section 509.1 of the *California Building Code*.

5808.3.1 Pressure control. Hydrogen fuel gas rooms shall be provided with a ventilation system designed to maintain the room at a negative pressure in relation to surrounding rooms and spaces.

5808.3.2 Windows. Operable windows in interior walls shall not be permitted. Fixed windows shall be permitted where in accordance with Section 716 of the *California Building Code*.

5808.4 Exhaust ventilation. Hydrogen fuel gas rooms shall be provided with mechanical exhaust ventilation in accordance with the applicable provisions of Section 2311.8.2.

5808.5 Gas detection system. Hydrogen fuel gas rooms shall be provided with a gas detection system that complies with Sections 916, 5808.5.1 and 5808.5.2.

5808.5.1 System activation. Activation of a gas detection system alarm shall result in both of the following:

1. Initiation of distinct audible and visible alarm signals both inside and outside of the hydrogen fuel gas room.
2. Automatic activation of the mechanical exhaust ventilation system.

5808.5.2 Failure of the gas detection system. Failure of the gas detection system shall automatically activate the mechanical exhaust ventilation system, stop hydrogen generation and cause a trouble signal to sound at an approved location.

5808.6 Explosion control. Explosion control shall be provided where required by Section 911.

5808.7 Standby power. Mechanical ventilation and gas detection systems shall be connected to a standby power system in accordance with Section 1203.

SECTION 5809—ON-DEMAND HYDROGEN MOBILE FUELING OPERATIONS

5809.1 General. On-demand hydrogen mobile fueling operations that dispense gaseous hydrogen into the fuel tanks of motor vehicles shall comply with Sections 5809.1 through 5809.6.5. *Mobile fueling of liquid hydrogen is prohibited.*

5809.1.1 Approval required. Hydrogen mobile fueling operations shall not be conducted without first obtaining a permit and approval from the fire code official. Hydrogen mobile fueling operations shall occur only at approved locations. The fire code official is authorized to approve individual locations or geographic areas where mobile fueling is allowed.

5809.2 Hydrogen mobile fueling vehicle or trailer. An on-demand hydrogen mobile fueling vehicle or mobile fueling trailer shall be that which is utilized in on-demand fueling operations for the dispensing of gaseous hydrogen into the fuel tanks of motor vehicles.

5809.2.1 Hydrogen mobile fueling vehicle requirements. Each hydrogen mobile fueling vehicle or mobile fueling trailer shall comply with all local, state and federal requirements, as well as the following:

1. The hydrogen mobile fueling vehicle or mobile fueling trailer and its equipment shall be in compliance with the appropriate requirements of NFPA 2 *and US DOTn requirements for the transportation of hydrogen gas.*
2. Hydrogen mobile fueling vehicles or mobile fueling trailers shall only contain and dispense gaseous hydrogen.
3. The hydrogen mobile fueling vehicle or mobile fueling trailer and its equipment shall be maintained in good repair.
4. Fueling a hydrogen motor vehicle shall be from tanks or containers mounted on a mobile fueling trailer or from tanks or containers mounted on a mobile fueling vehicle. A mobile fueling operation shall not combine a mobile fueling vehicle with a mobile fueling trailer.
5. Mobile fueling vehicles and trailers shall be provided with at least one portable fire extinguisher with a minimum *rating of 40-B:C on the mobile roadside service hydrogen-fueling vehicle with signage clearly indicating its location.*
6. *The roadside hydrogen service vehicle shall comply with all local, state and federal requirements.*
7. *Individual hydrogen fuel supply tanks installed on roadside hydrogen service vehicles shall have a maximum individual fuel capacity of 1,270 cubic feet (3 kg) of hydrogen.*
8. *The maximum aggregate amount of all hydrogen fuel in the supply tanks of roadside hydrogen service vehicles shall not exceed 4,233 cubic feet (10 kg) of hydrogen.*

5809.3 Required documents. Documents developed to comply with Sections 5809.3.1 through 5809.3.3 shall be *submitted to the fire code official prior to approval of the permit application to conduct mobile gaseous hydrogen fueling operations. Any modification to an approved plan shall be* updated as necessary by the owner of the mobile fueling operation and maintained in compliance with Section 110.3.

5809.3.1 Safety and emergency response plan. Hydrogen mobile fueling operators shall have an approved written safety and emergency response plan that establishes policies and procedures for fire safety, release and control, personnel training and compliance with other applicable requirements of this code. *Operators shall demonstrate readiness to respond to a hydrogen leak and carry out appropriate mitigation measures.*

5809.3.2 Training records. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be operated only by designated personnel who are trained on proper fueling procedures*, the equipment manufacturer's training and the appropriate mitigating actions in the event of a fire or a hydrogen leak prior to beginning the dispensing operations. Re-training shall be performed periodically, but no less frequent than annually.* Training records of operators shall be maintained *by the dispensing company and made available to the fire code official upon request.*

5809.3.3 Site plan. Where required by the fire code official, a site plan shall be developed for each location at which hydrogen mobile fueling occurs. The site plan shall be of sufficient detail to indicate the following:

1. All buildings and structures.
2. Lot lines or property lines.
3. Solar photovoltaic parking lot canopies.
4. Appurtenances on-site and their use *and* function.
5. All uses adjacent to the lot lines of the site.
6. Hydrogen fueling locations.
7. Scale of the site plan.

5809.4 Hydrogen mobile fueling areas. Hydrogen mobile fueling shall not occur on public streets, in public ways or inside buildings. Fueling on the roof level of parking structures or other buildings is prohibited.

Exception: *Fueling hydrogen-fueled vehicles on a public street during a roadside emergency.*

5809.4.1 Separation. The point of connection of the vehicle being *fueled and the roadside hydrogen service vehicle* shall not take place *less than 15 feet (4572 mm) from buildings, property lines or combustible storage.*

5809.4.2 Sources of ignition. Smoking, open flames and other sources of ignition, *including unrated electrical equipment,* shall be prohibited within 25 feet (7620 mm) of fuel-dispensing activities. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of fueling shall be prominently posted on the hydrogen mobile fueling vehicle. The fuel cell of vehicles being fueled shall be shut off during fueling.

5809.5 Equipment. Hydrogen mobile fueling equipment shall comply with Sections 5809.5.1 and 5809.5.2.

5809.5.1 Dispensing hoses, nozzles and equipment. Dispensing hoses, nozzles, equipment *and appurtenances* shall *be listed or approved by a recognized third party for its intended use and* comply with NFPA 2.

5809.5.1.1 Hose reel. *The dispensing hose shall be properly placed on an approved reel or in an approved compartment before moving the roadside hydrogen service vehicle.*

5809.5.1.2 Pressure limit. *Only dispensing of compressed gaseous hydrogen at partial pressure into the fuel tanks of hydrogen-fueled vehicles from on-board hydrogen supply tanks is allowed.*

5809.5.2 Fire extinguisher. An approved portable fire extinguisher complying with Section 906 with a minimum rating of 4-A:80-B:C shall be provided on the hydrogen mobile fueling vehicle with signage clearly indicating its location.

5809.6 Operations. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be operated in accordance with this section and NFPA 2.

5809.6.1 Attendant. Hydrogen mobile fueling vehicles or mobile fueling trailers shall be attended at all times during fueling operations, with brakes set and warning lights in operation.

5809.6.1.1 Bonding cable. *A bonding cable shall be securely connected between the mobile fueling vehicle and the fueled vehicle prior to the start of the dispensing operation.*

5809.6.1.2 Brakes. *During fueling operations, mobile fueling vehicle's brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.*

5809.6.2 Emergency access roads. Hydrogen mobile fueling vehicles shall not obstruct emergency vehicle access roads.

5809.6.3 Dispensing hose. Where equipped, hydrogen mobile fueling vehicles or mobile fueling trailers shall be positioned in a manner to preclude traffic from driving over the dispensing hose. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the mobile fueling vehicle. *The dispensing hose shall be equipped with a breakaway coupling installed within 3 feet (1 m) from the dispensing nozzle.*

5809.6.4 Safety cones. Safety cones or other visual barriers shall be employed as warning devices to highlight the vehicle fueling area.

5809.6.5 Vehicle lights. The hydrogen mobile fueling vehicle or mobile fueling trailer flasher lights shall be in operation while dispensing operations are in progress.

5809.6.5.1 Emergency communication device. *Operators of mobile, roadside service hydrogen fueling vehicles shall have in their possession at all times an emergency communication device to notify the proper authorities in the event of an emergency during fueling.*

5809.6.6 Nighttime deliveries. Nighttime deliveries shall be made only in areas deemed adequately lighted by the fire code official.

5809.6.7 Spill reporting. Releases shall be reported where required by Section 5003.3.1.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 59 – FLAMMABLE SOLIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

59

FLAMMABLE SOLIDS

User notes:

About this chapter: Chapter 59 addresses general requirements for storage and handling of flammable solids, especially magnesium; however, it is important to note that several other solid materials, including such metals as titanium, zirconium, hafnium, calcium, zinc, sodium, lithium, potassium, sodium/potassium alloys, uranium, thorium and plutonium, can be explosion hazards under the right conditions. Some of these metals are almost exclusively laboratory materials but because of where they are used, fire service personnel must be trained to handle emergency situations. Because uranium, thorium and plutonium are also radioactive materials, they pose more specialized problems for fire service personnel.

SECTION 5901—GENERAL

5901.1 Scope. The storage and use of flammable solids shall be in accordance with this chapter.

5901.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 5902—DEFINITIONS

5902.1 Definitions. The following terms are defined in Chapter 2:

FLAMMABLE SOLID.

MAGNESIUM.

SECTION 5903—GENERAL REQUIREMENTS

5903.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of flammable solids in amounts not exceeding the maximum allowable quantity per control area as indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003 and 5901.

5903.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of flammable solids exceeding the maximum allowable quantity per control area as indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

SECTION 5904—STORAGE

5904.1 Indoor storage. Indoor storage of flammable solids in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

5904.1.1 Pile size limits and location. Flammable solids stored in quantities greater than 1,000 cubic feet (28 m^3) shall be separated into piles each not larger than 1,000 cubic feet (28 m^3).

5904.1.2 Aisles. Aisle widths between piles shall be not less than the height of the piles or 4 feet (1219 mm), whichever is greater.

5904.1.3 Basement storage. Flammable solids shall not be stored in *basements*.

5904.2 Outdoor storage. Outdoor storage of flammable solids in amounts exceeding the maximum allowable quantities per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter. Outdoor storage of magnesium shall be in accordance with Section 5906.

5904.2.1 Distance from storage to exposures. Outdoor storage of flammable solids shall not be located within 20 feet (6096 mm) of a building, lot line, public street, public alley, public way or means of egress. A 2-hour fire barrier without openings or penetrations and extending 30 inches (762 mm) above and to the sides of the storage area is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

5904.2.2 Pile size limits. Outdoor storage of flammable solids shall be separated into piles not larger than 5,000 cubic feet (141 m^3) each. Piles shall be separated by aisles with a minimum width of not less than one-half the pile height or 10 feet (3048 mm), whichever is greater.

SECTION 5905—USE

5905.1 General. The use of flammable solids in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter. The use of magnesium shall be in accordance with Section 5906.

SECTION 5906—MAGNESIUM

5906.1 General. Storage, use, handling and processing of magnesium, including the pure metal and alloys of which the major part is magnesium, shall be in accordance with Chapter 50 and Sections 5906.2 through 5906.5.8.

5906.2 Storage of magnesium articles. The storage of magnesium shall comply with Sections 5906.2.1 through 5906.4.3.

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5906.2.1 Storage of greater than 50 cubic feet. Magnesium storage in quantities greater than 50 cubic feet (1.4 m^3) shall be separated from storage of other materials that are either combustible or in combustible containers by aisles. Piles shall be separated by aisles with a minimum width of not less than the pile height.

5906.2.2 Storage of greater than 1,000 cubic feet. Magnesium storage in quantities greater than 1,000 cubic feet (28 m^3) shall be separated into piles not larger than 1,000 cubic feet (28 m^3) each. Piles shall be separated by aisles with a minimum width of not less than the pile height. Such storage shall not be located in nonsprinklered buildings of Type III, IV or V construction, as defined in the *California Building Code*.

5906.2.3 Storage in combustible containers or within 30 feet of other combustibles. Where in nonsprinklered buildings of Type III, IV or V construction, as defined in the *California Building Code*, magnesium shall not be stored in combustible containers or within 30 feet (9144 mm) of other combustibles.

5906.2.4 Storage in foundries and processing plants. The size of storage piles of magnesium articles in foundries and processing plants shall not exceed 1,250 cubic feet (25 m^3). Piles shall be separated by aisles with a minimum width of not less than one-half the pile height.

5906.3 Storage of pigs, ingots and billets. The storage of magnesium pigs, ingots and billets shall comply with Sections 5906.3.1 and 5906.3.2.

5906.3.1 Indoor storage. Indoor storage of pigs, ingots and billets shall only be on floors of noncombustible construction. Piles shall not be larger than 500,000 pounds (226.8 metric tons) each. Piles shall be separated by aisles with a minimum width of not less than one-half the pile height.

5906.3.2 Outdoor storage. Outdoor storage of magnesium pigs, ingots and billets shall be in piles not exceeding 1,000,000 pounds (453.6 metric tons) each. Piles shall be separated by aisles with a minimum width of not less than one-half the pile height. Piles shall be separated from combustible materials or buildings on the same or adjoining property by a distance of not less than the height of the nearest pile.

5906.4 Storage of fine magnesium scrap. The storage of scrap magnesium shall comply with Sections 5906.4.1 through 5906.4.3.

5906.4.1 Separation. Magnesium fines shall be kept separate from other combustible materials.

5906.4.2 Storage of 50 to 1,000 cubic feet. Storage of fine magnesium scrap in quantities greater than 50 cubic feet (1.4 m^3) [six 55-gallon (208 L) steel drums] shall be separated from other occupancies by an open space of not less than 50 feet (15 240 mm) or by a fire barrier constructed in accordance with Section 707 of the *California Building Code*.

5906.4.3 Storage of greater than 1,000 cubic feet. Storage of fine magnesium scrap in quantities greater than 1,000 cubic feet (28 m^3) shall be separated from all buildings other than those used for magnesium scrap recovery operations by a distance of not less than 100 feet (30 480 mm).

5906.5 Use of magnesium. The use of magnesium shall comply with Sections 5906.5.1 through 5906.5.8.

5906.5.1 Melting pots. Floors under and around melting pots shall be of noncombustible construction.

5906.5.2 Heat-treating ovens. Approved means shall be provided for control of magnesium fires in heat-treating ovens.

5906.5.3 Dust collection. Magnesium grinding, buffing and wire-brushing operations, other than rough finishing of castings, shall be provided with approved hoods or enclosures for dust collection that are connected to a liquid-precipitation type of separator that converts dust to sludge without contact (in a dry state) with any high-speed moving parts.

5906.5.3.1 Duct construction. Connecting ducts or suction tubes shall be completely grounded, as short as possible, and without bends. Ducts shall be fabricated and assembled with a smooth interior, with internal lap joints pointing in the direction of airflow and without unused capped side outlets, pockets or other dead-end spaces that allow an accumulation of dust.

5906.5.3.2 Independent dust separators. Each machine shall be equipped with an individual dust-separating unit.

Exceptions:

1. One separator is allowed to serve two dust-producing units on multiunit machines.
2. One separator is allowed to serve not more than four portable dust-producing units in a single enclosure or stand.

5906.5.4 Power supply interlock. Power supply to machines shall be interlocked with exhaust airflow, and liquid pressure level or flow. The interlock shall be designed to shut down the machine it serves when the dust removal or separator system is not operating properly.

5906.5.5 Electrical equipment. Electric wiring, fixtures and equipment in the immediate vicinity of and attached to dust-producing machines, including those used in connection with separator equipment, shall be of approved types and shall be approved for use in Class II, Division 1 hazardous locations in accordance with *the California Electrical Code.*

5906.5.6 Grounding. Equipment shall be securely grounded by permanent ground wires in accordance with *the California Electrical Code.*

5906.5.7 Fire-extinguishing materials. Fire-extinguishing materials shall be provided for every operator performing machining, grinding or other processing operation on magnesium in accordance with either of the following:

1. Within 30 feet (9144 mm), a supply of extinguishing materials in an approved container with a hand scoop or shovel for applying the material.
2. Within 75 feet (22 860 mm), a portable fire extinguisher complying with Section 906.

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All extinguishing materials shall be approved for use on magnesium fires. Where extinguishing materials are stored in cabinets or other enclosed areas, the enclosures shall be openable without the use of a key or special knowledge.

5906.5.8 Collection of chips, turnings and fines. Chips, turnings and other fine magnesium scrap shall be collected from the pans or spaces under machines and from other places where they collect not less than once each working day. Such material shall be placed in a covered, vented steel container and removed to an approved location.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 60 – HIGHLY TOXIC AND TOXIC MATERIALS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

60

HIGHLY TOXIC AND TOXIC MATERIALS

User notes:

About this chapter: Chapter 60 provides requirements to protect occupants, emergency responders and those in the immediate area of the building and facility from short-term, acute hazards associated with a release of, or general exposure to, toxic and highly toxic materials. This chapter deals with all three states of toxic and highly toxic materials: solids, liquids and gases. This code does not address long-term exposure effects of these materials, which are addressed by agencies such as the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA).

SECTION 6001—GENERAL

6001.1 Scope. The storage and use of highly toxic and toxic materials shall comply with this chapter. Compressed gases shall also comply with Chapter 53.

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Conditions involving pesticides or agricultural products as follows:
   - 2.1. Application and release of pesticide, agricultural products and materials intended for use in weed abatement, erosion control, soil amendment or similar applications when applied in accordance with the manufacturer's instruction and label directions.
   - 2.2. Transportation of pesticides in compliance with the Federal Hazardous Materials Transportation Act and regulations thereunder.
   - 2.3. Storage in dwellings or private garages of pesticides registered by the US Environmental Protection Agency to be utilized in and around the home, garden, pool, spa and patio.

6001.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6002—DEFINITIONS

6002.1 Definitions. The following terms are defined in Chapter 2:

CONTAINMENT SYSTEM.

CONTAINMENT VESSEL.

EXCESS FLOW VALVE.

HIGHLY TOXIC.

OZONE-GAS GENERATOR.

PHYSIOLOGICAL WARNING THRESHOLD.

REDUCED FLOW VALVE.

TOXIC.

SECTION 6003—HIGHLY TOXIC AND TOXIC SOLIDS AND LIQUIDS

6003.1 Indoor storage and use. The indoor storage and use of highly toxic and toxic materials shall comply with Sections 6003.1.1 through 6003.1.5.3.

6003.1.1 Quantities not exceeding the maximum allowable quantity per control area. The indoor storage or use of highly toxic and toxic solids or liquids in amounts not exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(2) shall be in accordance with Sections 5001, 5003 and 6001.

6003.1.2 Quantities exceeding the maximum allowable quantity per control area. The indoor storage or use of highly toxic and toxic solids or liquids in amounts exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(2) shall be in accordance with Section 6001, Sections 6003.1.3 through 6003.1.5.3 and Chapter 50.

6003.1.3 Treatment system—highly toxic liquids. Exhaust scrubbers or other systems for processing vapors of highly toxic liquids shall be provided where a spill or accidental release of such liquids can be expected to release highly toxic vapors at normal temperature and pressure (NTP). Treatment systems and other processing systems shall be installed in accordance with the *California Mechanical Code*.

6003.1.4 Indoor storage. Indoor storage of highly toxic and toxic solids and liquids shall comply with Sections 6003.1.4.1 and 6003.1.4.2.

6003.1.4.1 Floors. In addition to the requirements set forth in Section 5004.12, floors of storage areas where highly toxic and toxic liquids are stored shall be of liquid-tight construction.

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6003.1.4.2 Separation—highly toxic solids and liquids. In addition to the requirements set forth in Section 5003.9.8, highly toxic solids and liquids in storage shall be located in approved hazardous material storage cabinets or isolated from other hazardous material storage by construction in accordance with the *California Building Code*.

6003.1.5 Indoor use. Indoor use of highly toxic and toxic solids and liquids shall comply with Sections 6003.1.5.1 through 6003.1.5.3.

6003.1.5.1 Liquid transfer. Highly toxic and toxic liquids shall be transferred in accordance with Section 5005.1.10.

6003.1.5.2 Exhaust ventilation for open systems. Mechanical exhaust ventilation shall be provided for highly toxic and toxic liquids used in open systems in accordance with Section 5005.2.1.1.

Exception: Liquids that do not generate highly toxic or toxic fumes, mists or vapors.

6003.1.5.3 Exhaust ventilation for closed systems. Mechanical exhaust ventilation shall be provided for highly toxic and toxic liquids used in closed systems in accordance with Section 5005.2.2.1.

Exception: Liquids that do not generate highly toxic or toxic fumes, mists or vapors.

6003.2 Outdoor storage and use. Outdoor storage and use of highly toxic and toxic materials shall comply with Sections 6003.2.1 through 6003.2.6.

6003.2.1 Quantities not exceeding the maximum allowable quantity per control area. The outdoor storage or use of highly toxic and toxic solids or liquids in amounts not exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(4) shall be in accordance with Sections 5001, 5003 and 6001.

6003.2.2 Quantities exceeding the maximum allowable quantity per control area. The outdoor storage or use of highly toxic and toxic solids or liquids in amounts exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(4) shall be in accordance with Sections 6001 and 6003.2 and Chapter 50.

6003.2.3 General outdoor requirements. The general requirements applicable to the outdoor storage of highly toxic or toxic solids and liquids shall be in accordance with Sections 6003.2.3.1 and 6003.2.3.2.

6003.2.3.1 Location. Outdoor storage or use of highly toxic or toxic solids and liquids shall not be located within 20 feet (6096 mm) of lot lines, public streets, public alleys, public ways, exit discharges or exterior wall openings. A 2-hour fire barrier without openings or penetrations extending not less than 30 inches (762 mm) above and to the sides of the storage is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

6003.2.3.2 Treatment system—highly toxic liquids. Exhaust scrubbers or other systems for processing vapors of highly toxic liquid shall be provided where a spill or accidental release of such liquids can be expected to release highly toxic vapors at normal temperature and pressure (NTP). Treatment systems and other processing systems shall be installed in accordance with the *California Mechanical Code*.

6003.2.4 Outdoor storage piles. Outdoor storage piles of highly toxic and toxic solids and liquids shall be separated into piles not larger than 2,500 cubic feet (71 m^3). Aisle widths between piles shall be not less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

6003.2.5 Weather protection for highly toxic liquids and solids—outdoor storage or use. Where overhead weather protection is provided for outdoor storage or use of highly toxic liquids or solids, and the weather protection is attached to a building, the storage or use area shall either be equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, or storage or use vessels shall be fire resistive. Weather protection shall be provided in accordance with Section 5004.13 for storage and Section 5005.3.9 for use.

6003.2.6 Outdoor liquid transfer. Highly toxic and toxic liquids shall be transferred in accordance with Section 5005.1.10.

SECTION 6004—HIGHLY TOXIC AND TOXIC COMPRESSED GASES

6004.1 General. The storage and use of highly toxic and toxic compressed gases shall comply with this section.

6004.1.1 Special limitations for indoor storage and use by occupancy. The indoor storage and use of highly toxic and toxic *compressed gases* in certain occupancies shall be subject to the limitations contained in Sections 6004.1.1.1 through 6004.1.1.3.

6004.1.1.1 Group A, E, I or U occupancies. Toxic and highly toxic compressed gases shall not be stored or used within Group A, E, I or U occupancies.

Exception: Cylinders not exceeding 20 cubic feet (0.566 m^3) at normal temperature and pressure (NTP) are allowed within gas cabinets or fume hoods.

6004.1.1.2 Group R occupancies. Toxic and highly toxic compressed gases shall not be stored or used in Group R occupancies.

6004.1.1.3 Offices, retail sales and classrooms. Toxic and highly toxic compressed gases shall not be stored or used in offices, retail sales or classroom portions of Group B, F, M or S occupancies.

Exception: In classrooms of Group B occupancies, cylinders with a capacity not exceeding 20 cubic feet (0.566 m^3) at NTP are allowed in gas cabinets or fume hoods.

6004.1.2 Gas cabinets. Gas cabinets containing highly toxic or toxic compressed gases shall comply with Section 5003.8.6 and the following requirements:

1. The average ventilation velocity at the face of gas cabinet access ports or windows shall be not less than 200 feet per minute (1.02 m/s) with not less than 150 feet per minute (0.76 m/s) at any point of the access port or window.
2. Gas cabinets shall be connected to an exhaust system.
3. Gas cabinets shall not be used as the sole means of exhaust for any room or area.
4. The maximum number of cylinders located in a single gas cabinet shall not exceed three, except that cabinets containing cylinders not exceeding 1 pound (0.454 kg) net contents are allowed to contain up to 100 cylinders.
5. Gas cabinets required by Section 6004.2 or 6004.3 shall be equipped with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

6004.1.3 Exhausted enclosures. Exhausted enclosures containing highly toxic or toxic compressed gases shall comply with Section 5003.8.5 and the following requirements:

1. The average ventilation velocity at the face of the enclosure shall be not less than 200 feet per minute (1.02 m/s) with not less than 150 feet per minute (0.76 m/s).
2. Exhausted enclosures shall be connected to an exhaust system.
3. Exhausted enclosures shall not be used as the sole means of exhaust for any room or area.
4. Exhausted enclosures required by Section 6004.2 or 6004.3 shall be equipped with an approved automatic sprinkler system in accordance with Section 903.3.1.1. Alternative fire-extinguishing systems shall not be used.

6004.2 Indoor storage and use. The indoor storage and use of highly toxic or toxic compressed gases shall be in accordance with Sections 6004.2.1 through 6004.2.2.10.3.

6004.2.1 Applicability. The applicability of regulations governing the indoor storage and use of highly toxic and toxic compressed gases shall be as set forth in Sections 6004.2.1.1 through 6004.2.1.3.

6004.2.1.1 Quantities not exceeding the maximum allowable quantity per control area. The indoor storage or use of highly toxic and toxic gases in amounts not exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(2) shall be in accordance with Sections 5001, 5003, 6001 and 6004.1.

6004.2.1.2 Quantities exceeding the maximum allowable quantity per control area. The indoor storage or use of highly toxic and toxic gases in amounts exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(2) shall be in accordance with Sections 6001, 6004.1, 6004.2 and Chapter 50.

6004.2.1.3 Ozone-gas generators. The indoor use of ozone-gas-generating equipment shall be in accordance with Section 6005.

6004.2.2 General indoor requirements. The general requirements applicable to the indoor storage and use of highly toxic and toxic compressed gases shall be in accordance with Sections 6004.2.2.1 through 6004.2.2.10.3.

6004.2.2.1 Cylinder and tank location. Cylinders shall be located within gas cabinets, exhausted enclosures or gas rooms. Portable and stationary tanks shall be located within gas rooms or exhausted enclosures.

6004.2.2.2 Ventilated areas. The room or area in which gas cabinets or exhausted enclosures are located shall be provided with exhaust ventilation. Gas cabinets or exhausted enclosures shall not be used as the sole means of exhaust for any room or area.

6004.2.2.3 Leaking cylinders and tanks. One or more gas cabinets or exhausted enclosures shall be provided to handle leaking cylinders, containers or tanks.

Exceptions:

1. Where cylinders, containers or tanks are located within gas cabinets or exhausted enclosures.
2. Where approved containment vessels or containment systems are provided in accordance with all of the following:
   2.1. Containment vessels or containment systems shall be capable of fully containing or terminating a release.
   2.2. Trained personnel shall be available at an approved location.
   2.3. Containment vessels or containment systems shall be capable of being transported to the leaking cylinder, container or tank.

6004.2.2.3.1 Location. Gas cabinets and exhausted enclosures shall be located in gas rooms and connected to an exhaust system.

6004.2.2.4 Local exhaust for portable tanks. A means of local exhaust shall be provided to capture leaks from portable tanks. The local exhaust shall consist of portable ducts or collection systems designed to be applied to the site of a leak in a valve or fitting on the tank. The local exhaust system shall be located in a gas room. Exhaust shall be directed to a treatment system in accordance with Section 6004.2.2.7.

6004.2.2.5 Piping and controls—stationary tanks. In addition to the requirements of Section 5003.2.2, piping and controls on stationary tanks shall comply with the following requirements:

1. Pressure relief devices shall be vented to a treatment system designed in accordance with Section 6004.2.2.7.

   Exception: Pressure relief devices on outdoor tanks provided exclusively for relieving pressure due to fire exposure are not required to be vented to a treatment system provided that:

   1. The material in the tank is not flammable.

2. The tank is not located in a diked area with other tanks containing combustible materials.
3. The tank is located not less than 30 feet (9144 mm) from combustible materials or structures or is shielded by a fire barrier complying with Section 6004.3.2.1.1.

2. Filling or dispensing connections shall be provided with a means of local exhaust. Such exhaust shall be designed to capture fumes and vapors. The exhaust shall be directed to a treatment system in accordance with Section 6004.2.2.7.
3. Stationary tanks shall be provided with a means of excess flow control on all tank inlet or outlet connections.

Exceptions:

1. Inlet connections designed to prevent backflow.
2. Pressure relief devices.

6004.2.2.6 Gas rooms. Gas rooms shall comply with Section 5003.8.4 and both of the following requirements:

1. The exhaust ventilation from gas rooms shall be directed to an exhaust system.
2. Gas rooms shall be equipped with an approved automatic sprinkler system. Alternative fire-extinguishing systems shall not be used.

6004.2.2.7 Treatment systems. The exhaust ventilation from gas cabinets, exhausted enclosures and gas rooms, and local exhaust systems required in Sections 6004.2.2.4 and 6004.2.2.5 shall be directed to a treatment system. The treatment system shall be utilized to handle the accidental release of gas and to process exhaust ventilation. The treatment system shall be designed in accordance with Sections 6004.2.2.7.1 through 6004.2.2.7.5 and Section 509 of the *California Mechanical Code*.

Exceptions:

1. Highly toxic and toxic gases—storage. A treatment system is not required for cylinders, containers and tanks in storage where all of the following controls are provided:
   1.1. Valve outlets are equipped with gastight outlet plugs or caps.
   1.2. Handwheel-operated valves have handles secured to prevent movement.
   1.3. Approved containment vessels or containment systems are provided in accordance with Section 6004.2.2.3.
2. Toxic gases—use. Treatment systems are not required for toxic gases supplied by cylinders or portable tanks not exceeding 1,700 pounds (772 kg) water capacity where a gas detection system complying with Section 6004.2.2.10 and listed or approved automatic-closing fail-safe valves are provided. The gas detection system shall have a sensing interval not exceeding 5 minutes. Automatic-closing fail-safe valves shall be located immediately adjacent to cylinder valves and shall close when gas is detected at the permissible exposure limit (PEL) by a gas sensor monitoring the exhaust system at the point of discharge from the gas cabinet, exhausted enclosure, ventilated enclosure or gas room.

6004.2.2.7.1 Design. Treatment systems shall be capable of diluting, adsorbing, absorbing, containing, neutralizing, burning or otherwise processing the contents of the largest single vessel of compressed gas. Where a total containment system is used, the system shall be designed to handle the maximum anticipated pressure of release to the system when it reaches equilibrium.

6004.2.2.7.2 Performance. Treatment systems shall be designed to reduce the maximum allowable discharge concentrations of the gas to one-half immediate by dangerous to life and health (IDLH) at the point of discharge to the atmosphere. Where more than one gas is emitted to the treatment system, the treatment system shall be designed to handle the worst-case release based on the release rate, the quantity and the IDLH for all compressed gases stored or used.

6004.2.2.7.3 Sizing. Treatment systems shall be sized to process the maximum worst-case release of gas based on the maximum flow rate of release from the largest vessel utilized. The entire contents of the largest compressed gas vessel shall be considered.

6004.2.2.7.4 Stationary tanks. Stationary tanks shall be labeled with the maximum rate of release for the *compressed gas* contained based on valves or fittings that are inserted directly into the tank. Where multiple valves or fittings are provided, the maximum flow rate of release for valves or fittings with the highest flow rate shall be indicated. Where liquefied compressed gases are in contact with valves or fittings, the liquid flow rate shall be utilized for computation purposes. Flow rates indicated on the label shall be converted to cubic feet per minute (cfm/min) (m^3/s) of gas at normal temperature and pressure (NTP).

6004.2.2.7.5 Portable tanks and cylinders. The maximum flow rate of release for portable tanks and cylinders shall be calculated based on the total release from the cylinder or tank within the time specified in Table 6004.2.2.7.5. Where portable tanks or cylinders are equipped with approved excess flow or reduced flow valves, the worst-case release shall be determined by the maximum achievable flow from the valve as determined by the valve manufacturer or compressed gas supplier. Reduced flow and excess flow valves shall be permanently marked by the valve manufacturer to indicate the maximum design flow rate. Such markings shall indicate the flow rate for air under normal temperature and pressure (NTP).

TABLE 6004.2.2.7.5—RATE OF RELEASE FOR CYLINDERS AND PORTABLE TANKS		
VESSEL TYPE	NONLIQUEFIED (minutes)	LIQUEFIED (minutes)
Containers	5	30
Portable tanks	40	240

6004.2.2.8 Emergency power. Emergency power shall be provided for the following systems in accordance with Section 603:

1. Exhaust ventilation system.
2. Treatment system.
3. Gas detection system.
4. Smoke detection system.
5. Temperature control system.
6. Fire alarm system.
7. Emergency alarm system.

6004.2.2.8.1 Fail-safe engineered systems. Emergency power shall not be required for mechanical exhaust ventilation, treatment systems and temperature control systems where approved fail-safe engineered systems are installed.

6004.2.2.9 Automatic fire detection system—highly toxic compressed gases. An approved automatic fire detection system shall be installed in rooms or areas where highly toxic compressed gases are stored or used. Activation of the detection system shall sound a local alarm. The fire detection system shall comply with Section 907.

6004.2.2.10 Gas detection system. A gas detection system complying with Section 916 shall be provided to detect the presence of gas at or below the PEL or ceiling limit of the gas for which detection is provided. The system shall be capable of monitoring the discharge from the treatment system at or below one-half the IDLH limit and shall initiate a response in accordance with Sections 6004.2.2.10.1 through 6004.2.2.10.3 if the gas detection alarm is activated.

Exception: A gas detection system is not required for toxic gases when the physiological warning threshold level for the gas is at a level below the accepted PEL for the gas.

6004.2.2.10.1 Alarms. The gas detection system shall initiate a local alarm and transmit a signal to a constantly attended control station when a short-term hazard condition is detected. The alarm shall be both audible and visible and shall provide warning both inside and outside the area where gas is detected. The audible alarm shall be distinct from all other alarms.

Exception: Signal transmission to a constantly attended control station is not required where not more than one cylinder of highly toxic or toxic gas is stored.

6004.2.2.10.2 Shut off of gas supply. The gas-detection system shall automatically close the shutoff valve at the source on gas supply piping and tubing related to the system being monitored for whichever gas is detected.

Exception: Automatic shutdown is not required for reactors utilized for the production of highly toxic or toxic compressed gases where such reactors are:

1. Operated at pressures less than 15 pounds per square inch gauge (psig) (103.4 kPa).
2. Constantly attended.
3. Provided with emergency shutoff valves that have ready access.

6004.2.2.10.3 Valve closure. Automatic closure of shutoff valves shall be in accordance with the following:

1. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas cabinet or exhausted enclosure, the shutoff valve in the gas cabinet or exhausted enclosure for the specific gas detected shall automatically close.
2. Where the gas-detection sampling point initiating the gas detection system alarm is within a gas room and compressed gas containers are not in gas cabinets or exhausted enclosures, the shutoff valves on all gas lines for the specific gas detected shall automatically close.
3. Where the gas-detection sampling point initiating the gas detection system alarm is within a piping distribution manifold enclosure, the shutoff valve for the compressed container of specific gas detected supplying the manifold shall automatically close.

Exception: Where the gas-detection sampling point initiating the gas-detection system alarm is at a use location or within a gas valve enclosure of a branch line downstream of a piping distribution manifold, the shutoff valve in the gas valve enclosure for the branch line located in the piping distribution manifold enclosure shall automatically close.

6004.3 Outdoor storage and use. The outdoor storage and use of highly toxic and toxic compressed gases shall be in accordance with Sections 6004.3.1 through 6004.3.4.

6004.3.1 Applicability. The applicability of regulations governing the outdoor storage and use of highly toxic and toxic compressed gases shall be as set forth in Sections 6004.3.1.1 through 6004.3.1.3.

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6004.3.1.1 Quantities not exceeding the maximum allowable quantity per control area. The outdoor storage or use of highly toxic and toxic gases in amounts not exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(4) shall be in accordance with Sections 5001, 5003 and 6001.

6004.3.1.2 Quantities exceeding the maximum allowable quantity per control area. The outdoor storage or use of highly toxic and toxic gases in amounts exceeding the maximum allowable quantity per control area set forth in Table 5003.1.1(4) shall be in accordance with Sections 6001 and 6004.3 and Chapter 50.

6004.3.1.3 Ozone-gas generators. The outdoor use of ozone-gas-generating equipment shall be in accordance with Section 6005.

6004.3.2 General outdoor requirements. The general requirements applicable to the outdoor storage and use of highly toxic and toxic compressed gases shall be in accordance with Sections 6004.3.2.1 through 6004.3.2.4.

6004.3.2.1 Location. Outdoor storage or use of highly toxic or toxic compressed gases shall be located in accordance with Sections 6004.3.2.1.1 through 6004.3.2.1.3.

Exception: Compressed gases located in gas cabinets complying with Sections 5003.8.6 and 6004.1.2 and located 5 feet (1524 mm) or more from buildings and 25 feet (7620 mm) or more from an exit discharge.

6004.3.2.1.1 Distance limitation to exposures. Outdoor storage or use of highly toxic or toxic compressed gases shall not be located within 75 feet (22 860 mm) of a lot line, public street, public alley, public way, exit discharge or building not associated with the manufacture or distribution of such gases, unless all of the following conditions are met:

1. Storage is shielded by a 2-hour fire barrier that interrupts the line of sight between the storage and the exposure.
2. The 2-hour fire barrier shall be located not less than 5 feet (1524 mm) from any exposure.
3. The 2-hour fire barrier shall not have more than two sides at approximately 90-degree (1.57 rad) directions, or three sides with connecting angles of approximately 135 degrees (2.36 rad).

6004.3.2.1.2 Openings in exposed buildings. Where the storage or use area is located closer than 75 feet (22 860 mm) to a building not associated with the manufacture or distribution of highly toxic or toxic compressed gases, openings into a building other than for piping are not allowed above the height of the top of the 2-hour fire barrier or within 50 feet (15 240 mm) horizontally from the storage area whether or not shielded by a fire barrier.

6004.3.2.1.3 Air intakes. The storage or use area shall not be located within 75 feet (22 860 mm) of air intakes.

6004.3.2.2 Leaking cylinders and tanks. The requirements of Section 6004.2.2.3 shall apply to outdoor cylinders and tanks. Gas cabinets and exhausted enclosures shall be located within or immediately adjacent to outdoor storage or use areas.

6004.3.2.3 Local exhaust for portable tanks. Local exhaust for outdoor portable tanks shall be provided in accordance with the requirements set forth in Section 6004.2.2.4.

6004.3.2.4 Piping and controls—stationary tanks. Piping and controls for outdoor stationary tanks shall be in accordance with the requirements set forth in Section 6004.2.2.5.

6004.3.3 Outdoor storage weather protection for portable tanks and cylinders. Weather protection in accordance with Section 5004.13 shall be provided for portable tanks and cylinders located outdoors and not within gas cabinets or exhausted enclosures. The storage area shall be equipped with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Exception: An automatic sprinkler system is not required where:

1. All materials under the weather protection structure, including hazardous materials and the containers in which they are stored, are noncombustible.
2. The weather protection structure is located not less than 30 feet (9144 mm) from combustible materials or structures or is separated from such materials or structures using a fire barrier complying with Section 6004.3.2.1.1.

6004.3.4 Outdoor use of cylinders, containers and portable tanks. Cylinders, containers and portable tanks in outdoor use shall be located in gas cabinets or exhausted enclosures and shall comply with Sections 6004.3.4.1 through 6004.3.4.3.

6004.3.4.1 Treatment systems. The treatment system requirements set forth in Section 6004.2.2.7 shall apply to highly toxic or toxic gases located outdoors.

6004.3.4.2 Emergency power. The requirements for emergency power set forth in Section 6004.2.2.8 shall apply to highly toxic or toxic gases located outdoors.

6004.3.4.3 Gas detection system. The gas detection system requirements set forth in Section 6004.2.2.10 shall apply to highly toxic or toxic gases located outdoors.

SECTION 6005—OZONE-GAS GENERATORS

6005.1 Scope. Ozone-gas generators having a maximum ozone-generating capacity of 0.5 pound (0.23 kg) or more over a 24-hour period shall be in accordance with Sections 6005.2 through 6005.6.

Exceptions:

1. Ozone-generating equipment used in Group R-3 occupancies.
2. Ozone-generating equipment where used in Group H-5 occupancies where in compliance with Chapters 27 and 50 and the other provisions in this chapter for highly toxic gases.

6005.2 Design. Ozone-gas generators shall be designed, fabricated and tested in accordance with NEMA 250.

6005.3 Location. Ozone generators shall be located in approved cabinets or ozone generator rooms in accordance with Section 6005.3.1 or 6005.3.2.

Exception: An ozone-gas generator within an approved pressure vessel where located outside of buildings.

6005.3.1 Cabinets. Ozone cabinets shall be constructed of approved materials and compatible with ozone. Cabinets shall display an approved sign stating: "OZONE-GAS GENERATOR—HIGHLY TOXIC—OXIDIZER."

Cabinets shall be braced for seismic activity in accordance with the *California Building Code*.

Cabinets shall be mechanically ventilated in accordance with the *California Mechanical Code* with not less than six air changes per hour.

The average velocity of ventilation at makeup air openings with cabinet doors closed shall be not less than 200 feet per minute (1.02 m/s).

6005.3.2 Ozone-gas-generator rooms. Ozone-gas-generator rooms shall be mechanically ventilated in accordance with the *California Mechanical Code* with not less than six air changes per hour. Ozone-gas-generator rooms shall be equipped with a gas detection system complying with Section 916 that will shut off the generator and sound a local alarm when concentrations above the permissible exposure limit (PEL) occur.

Ozone-gas-generator rooms shall not be normally occupied, and such rooms shall be kept free of combustible and hazardous material storage. Room access doors shall display an approved sign stating: "OZONE-GAS GENERATOR—HIGHLY TOXIC—OXIDIZER."

6005.4 Piping, valves and fittings. Piping, valves, fittings and related components used to convey ozone shall be in accordance with Sections 6005.4.1 through 6005.4.3.

6005.4.1 Piping. Piping shall be welded stainless steel piping or tubing.

Exceptions:

1. Double-walled piping.
2. Piping, valves, fittings and related components located in exhausted enclosures.

6005.4.2 Materials. Materials shall be compatible with ozone and shall be rated for the design operating pressures.

6005.4.3 Identification. Piping shall be identified with the following: "OZONE GAS—HIGHLY TOXIC—OXIDIZER."

6005.5 Automatic shutdown. Ozone-gas generators shall be designed to shut down automatically under the following conditions:

1. When the dissolved ozone concentration in the water being treated is above saturation when measured at the point where the water is exposed to the atmosphere.
2. When the process using generated ozone is shut down.
3. Failure of the ventilation system for the cabinet or ozone-generator room.
4. Failure of the gas detection system in an ozone-gas-generator room.

6005.6 Manual shutdown. Manual shutdown controls shall be provided at the generator and, where in a room, within 10 feet (3048 mm) of the main exit or exit access door.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 61 – LIQUEFIED PETROLEUM GASES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			**X**																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				**X**																			
Chapter / Section																							
[T-19 §3.22 (a)(c)]				X																			
[T-19 §3.22 (b)]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

61

LIQUEFIED PETROLEUM GASES

User notes:

About this chapter: Chapter 61 provides requirements for the safe handling, storing and use of LP-gas to reduce the possibility of damage to containers, accidental releases of LP-gas, and exposure of flammable concentrations of LP-gas to ignition sources. LP-gas (notably propane) is well-known as a camping fuel for cooking, lighting, heating and refrigerating and also remains a popular standby fuel supply for auxiliary generators, as well as being widely used as an alternative motor vehicle fuel. Its characteristic as a clean-burning fuel has resulted in the addition of propane dispensers to service stations throughout the country. Dispensing LP-gas into motor vehicles is addressed by Chapter 23.

SECTION 6101—GENERAL

6101.1 Scope. Storage, handling and transportation of liquefied petroleum gas (LP-gas) and the installation of LP-gas equipment pertinent to systems for such uses shall comply with this chapter and NFPA 58. Properties of LP-gases shall be determined in accordance with Appendix B of NFPA 58.

[California Code of Regulations, Title 19, Division 1, §3.22(a) and (c)] Liquefied Petroleum Gas.

(a) When liquefied petroleum gas is used, the storage and handling thereof shall conform to the appropriate provisions referenced in California Code of Regulations, Title 19, Division 1, Sections 3.02 and 3.03.

(c) California Code of Regulations, Title 8, Section 475 is hereby adopted as a part of Title 19, Division 1 regulations.

6101.2 Permits. Permits shall be required as set forth in Sections 105.5 and 105.6.

Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the fire code official.

6101.3 Construction documents. Where a single LP-gas container is more than 2,000 gallons (7570 L) in water capacity or the aggregate water capacity of LP-gas containers is more than 4,000 gallons (15 140 L), the installer shall submit construction documents for such installation.

SECTION 6102—DEFINITIONS

6102.1 Definitions. The following terms are defined in Chapter 2:

LIQUEFIED PETROLEUM GAS (LP-gas).

LP-GAS CONTAINER.

SECTION 6103—INSTALLATION OF EQUIPMENT

6103.1 General. LP-gas equipment shall be installed in accordance with the *International Fuel Gas Code* and NFPA 58, except as otherwise provided in this chapter.

6103.2 Use of LP-gas containers in buildings. The use of LP-gas containers in buildings shall be in accordance with Sections 6103.2.1 through 6103.2.2.

6103.2.1 Portable containers. Portable LP-gas containers, as defined in NFPA 58, shall not be used in buildings except as specified in NFPA 58 and Sections 6103.2.1.1 through 6103.2.1.7.

6103.2.1.1 Use in basement, pit or similar location. LP-gas containers shall not be used in a basement, pit, above-grade underfloor space or similar location where heavier-than-air gas might collect unless such location is provided with an approved means of ventilation.

Exception: Use with self-contained torch assemblies in accordance with Section 6103.2.1.6.

6103.2.1.2 Construction and temporary heating. Portable LP-gas containers are allowed to be used in buildings or areas of buildings undergoing construction or for temporary heating as set forth in Sections 6.22.4, 6.22.5 and 6.22.8 of NFPA 58.

6103.2.1.3 Group F occupancies. In Group F occupancies, portable LP-gas containers are allowed to be used to supply quantities necessary for processing, research or experimentation. Where manifolded, the aggregate water capacity of such containers shall not exceed 735 pounds (334 kg) per manifold. Where multiple manifolds of such containers are present in the same room, each manifold shall be separated from other manifolds by a distance of not less than 20 feet (6096 mm).

6103.2.1.4 Research and experimentation. In Group I occupancies and laboratories for educational use in Group B and E occupancies, portable LP-gas containers are allowed to be used for research and experimentation. Such containers shall not be used in classrooms. Such containers shall not exceed a 50-pound (23 kg) water capacity in occupancies used for educational purposes and shall not exceed a 12-pound (5 kg) water capacity in occupancies used for institutional purposes. Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

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[California Code of Regulations, Title 19, Division 1, §3.22(b)] Liquefied Petroleum Gas.

(b) All liquefied petroleum gas tanks located in school yards shall be surrounded by a rugged steel fence or equivalent. Tanks in other occupancies shall also be so protected if in the opinion of the enforcement agency such protection is needed to prevent unauthorized tampering. The fence shall be at least 6 feet in height and, if it completely surrounds the tank, shall be located a minimum of 3 feet from the tanks. Fenced areas shall be locked when unattended.

6103.2.1.5 Demonstration uses. Portable LP-gas containers are allowed to be used temporarily for demonstrations and public exhibitions. Such containers shall not exceed a water capacity of 12 pounds (5 kg). Where more than one such container is present in the same room, each container shall be separated from other containers by a distance of not less than 20 feet (6096 mm).

6103.2.1.6 Use with self-contained torch assemblies. Portable LP-gas containers are allowed to be used to supply approved self-contained torch assemblies or similar appliances. Such containers shall not exceed a water capacity of 2.7 pounds (1.2 kg).

6103.2.1.7 Use for food preparation. Where approved, listed LP-gas commercial food service appliances are allowed to be used for food-preparation within restaurants and in attended commercial food-catering operations in accordance with the *International Fuel Gas Code*, the *California Mechanical Code* and NFPA 58.

6103.2.2 Industrial vehicles and floor maintenance machines. LP-gas containers on industrial vehicles and floor maintenance machines shall comply with Sections 11.11 and 11.12 of NFPA 58.

6103.3 Location of equipment and piping. Equipment and piping shall not be installed in locations where such equipment and piping is prohibited by the *International Fuel Gas Code*.

SECTION 6104—LOCATION OF LP-GAS CONTAINERS

6104.1 General. The storage and handling of LP-gas and the installation and maintenance of related equipment shall comply with NFPA 58 and be subject to the approval of the fire code official, except as provided in this chapter.

6104.2 Maximum capacity within established limits. For the protection of heavily populated or congested areas, storage of liquified petroleum gas shall not exceed an aggregate capacity in any one installation of 2,000 gallons (7570 L) within the limits established by law as set forth in the fire code adoption ordinance or other regulation adopted by the jurisdiction.

Exception: In particular installations, this capacity limit shall be determined by the fire code official, after consideration of special features such as topographical conditions, nature of occupancy, and proximity to buildings, capacity of proposed LP-gas containers, degree of fire protection to be provided and capabilities of the local fire department.

6104.3 Container location. LP-gas containers shall be located with respect to buildings and lot lines of adjoining property that can be built on, in accordance with Table 6104.3.

TABLE 6104.3—LOCATION OF LP-GAS CONTAINERS

LP-GAS CONTAINER CAPACITY (water gallons)	MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS AND BUILDINGS, PUBLIC WAYS[g] OR LOT LINES OF ADJOINING PROPERTY THAT CAN BE BUILT ON		MINIMUM SEPARATION BETWEEN LP-GAS CONTAINERS[b, c] (feet)
	Mounded or underground LP-gas containers[a](feet)	Above-ground LP-gas containers[b](feet)	
Less than 125[c, d]	10	5[e]	None
125 to 250	10	10	None
251 to 500	10	10	3
501 to 2,000	10	25[e, f]	3
2,001 to 30,000	50	50	5
30,001 to 70,000	50	75	(0.25 of sum of diameters of adjacent LP-gas containers)
70,001 to 90,000	50	100	
90,001 to 120,000	50	125	

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. Minimum distance for underground LP-gas containers shall be measured from the pressure relief device and the filling or liquid-level gauge vent connection at the container, except that all parts of an underground LP-gas container shall be not less than 10 feet from a building or lot line of adjoining property that can be built on.

b. For other than installations in which the overhanging structure is 50 feet or more above the relief-valve discharge outlet. In applying the distance between buildings and ASME LP-gas containers with a water capacity of 125 gallons or more, not less than 50 percent of this horizontal distance shall also apply to all portions of the building that project more than 5 feet from the building wall and that are higher than the relief valve discharge outlet. This horizontal distance shall be measured from a point determined by projecting the outside edge of such overhanging structure vertically downward to grade or other level on which the LP-gas container is installed. Distances to the building wall shall be not less than those prescribed in this table.

c. Where underground multicontainer installations are composed of individual LP-gas containers having a water capacity of 125 gallons or more, such containers shall be installed so as to provide access at their ends or sides to facilitate working with cranes or hoists.

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TABLE 6104.3—LOCATION OF LP-GAS CONTAINERS—continued

d. At a consumer site, if the aggregate water capacity of a multiple-container installation, comprised of individual LP-gas containers having a water capacity of less than 125 gallons, is 500 gallons or more, the minimum distance shall comply with the appropriate portion of this table, applying the aggregate capacity rather than the capacity per LP-gas container. If more than one such installation is made, each installation shall be separated from other installations by not less than 25 feet. Minimum distances between LP-gas containers need not be applied.

e. The following shall apply to above-ground containers installed alongside buildings:
   1. LP-gas containers of less than a 125-gallon water capacity are allowed without a separation distance where in compliance with Items 2, 3 and 4.
   2. Department of Transportation (DOTn) specification LP-gas containers shall be located and installed so that the discharge from the container pressure relief device is not less than 3 feet horizontally from building openings below the level of such discharge and shall not be beneath buildings unless the space is well ventilated to the outside and is not enclosed for more than 50 percent of its perimeter. The discharge from LP-gas container pressure relief devices shall be located not less than 5 feet from exterior sources of ignition, openings into direct-vent (sealed combustion system) appliances or mechanical ventilation air intakes.
   3. ASME LP-gas containers of less than a 125-gallon water capacity shall be located and installed such that the discharge from pressure relief devices shall not terminate in or beneath buildings and shall be located not less than 5 feet horizontally from building openings below the level of such discharge and not less than 5 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances, or mechanical ventilation air intakes.
   4. The filling connection and the vent from liquid-level gauges on either DOTn or ASME LP-gas containers filled at the point of installation shall be not less than 10 feet from exterior sources of ignition, openings into direct vent (sealed combustion system) appliances or mechanical ventilation air intakes.

f. This distance is allowed to be reduced to not less than 10 feet for a single LP-gas container of 1,200-gallon water capacity or less, provided that such container is not less than 25 feet from other LP-gas containers of more than 125-gallon water capacity.

g. Above-ground LP-gas containers with a water capacity of 2,000 gallons or less shall be separated from public ways by a distance of not less than 5 feet. Containers with a water capacity greater than 2,000 gallons shall be separated from public ways in accordance with this table.

6104.3.1 Installation on roof prohibited. LP-gas containers used in stationary installations shall not be located on the roofs of buildings.

6104.3.2 Special hazards. LP-gas containers shall be located with respect to special hazards including, but not limited to, above-ground flammable or combustible liquid tanks, oxygen or gaseous hydrogen containers, flooding or electric power lines as specified in Section 6.5.3 of NFPA 58.

6104.4 Multiple LP-gas container installations. Multiple LP-gas container installations with a total water storage capacity of more than 180,000 gallons (681.3 kL) [150,000-gallon (567.8 kL) LP-gas capacity] shall be subdivided into groups containing not more than 180,000 gallons (681.3 kL) in each group. Such groups shall be separated by a distance of not less than 50 feet (15 240 mm), unless the containers are protected in accordance with one of the following:

1. Mounded in an approved manner.
2. Protected with approved insulation on areas that are subject to impingement of ignited gas from pipelines or other leakage.
3. Protected by fire walls of approved construction.
4. Protected by an approved system for application of water as specified in Table 6.5.1.2 of NFPA 58.
5. Protected by other approved means.

Where one of these forms of protection is provided, the separation shall be not less than 25 feet (7620 mm) between LP-gas container groups.

SECTION 6105—PROHIBITED USE OF LP-GAS

6105.1 Nonapproved equipment. LP-gas shall not be used for the purpose of operating devices or equipment unless such device or equipment is approved for use with LP-gas.

6105.2 Release to the atmosphere. LP-gas shall not be released to the atmosphere, except in accordance with Section 7.3 of NFPA 58.

SECTION 6106—DISPENSING AND OVERFILLING

6106.1 Attendants. Dispensing of LP-gas shall be performed by a qualified attendant.

6106.2 Overfilling. LP-gas containers shall not be filled or maintained with LP-gas in excess of either the volume determined using the fixed liquid-level gauge installed in accordance with the manufacturer's specifications and in accordance with Section 5.9.5 of NFPA 58 or the weight determined by the required percentage of the water capacity marked on the container. Portable LP-gas containers shall not be refilled unless equipped with an overfilling prevention device (OPD) where required by Section 5.9.3 of NFPA 58.

6106.3 Dispensing locations. The point of transfer of LP-gas from one LP-gas container to another shall be separated from exposures as specified in NFPA 58.

SECTION 6107—SAFETY PRECAUTIONS AND DEVICES

6107.1 Safety devices. Safety devices on LP-gas containers, equipment and systems shall not be tampered with or made ineffective.

6107.2 Smoking and other sources of ignition. "No Smoking" signs complying with Section 310 shall be posted where required by the fire code official. Smoking within 25 feet (7620 mm) of a point of transfer, while filling operations are in progress at LP-gas containers or vehicles, shall be prohibited.

Control of other sources of ignition shall comply with Chapter 3 of this code and Section 6.25 of NFPA 58.

6107.3 Clearance to combustibles. Weeds, grass, brush, trash and other combustible materials shall be kept not less than 10 feet (3048 mm) from LP-gas tanks or containers.

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6107.4 Protecting containers from vehicles. Where exposed to vehicular damage due to proximity to alleys, driveways or parking areas, LP-gas containers, regulators and piping shall be protected in accordance with NFPA 58.

SECTION 6108—FIRE PROTECTION

6108.1 General. Fire protection shall be provided for installations having LP-gas storage containers with a water capacity of more than 4,000 gallons (15 140 L), as required by Section 6.29 of NFPA 58.

6108.2 Portable fire extinguishers. Portable fire extinguishers complying with Section 906 shall be provided as specified in NFPA 58.

SECTION 6109—STORAGE OF PORTABLE LP-GAS CONTAINERS AWAITING USE OR RESALE

6109.1 General. Storage of portable LP-gas containers of 1,000 pounds (454 kg) or less, whether filled, partially filled or empty, at consumer sites or distribution points, and for resale by dealers or resellers shall comply with Sections 6109.2 through 6109.15.1.

Exceptions:

1. LP-gas containers that have not previously been in LP-gas service.
2. LP-gas containers at distribution plants.
3. LP-gas containers at consumer sites or distribution points, which are connected for use.

6109.2 Exposure hazards. LP-gas containers in storage shall be located in a manner that minimizes exposure to excessive temperature rise, physical damage or tampering.

6109.3 Position. LP-gas containers in storage having individual water capacity greater than 2.7 pounds (1.2 kg) [nominal 1-pound (0.454 kg) LP-gas capacity] shall be positioned with the pressure relief valve in direct communication with the vapor space of the container.

6109.4 Separation from means of egress. LP-gas containers stored in buildings in accordance with Sections 6109.9 and 6109.11 shall not be located near exit access doors, exits, stairways or in areas normally used, or intended to be used, as a means of egress.

6109.5 Quantity. Empty LP-gas containers that have been in LP-gas service shall be considered as full containers for the purpose of determining the maximum quantities of LP-gas allowed in Sections 6109.9 and 6109.11.

6109.6 Storage on roofs. LP-gas containers that are not connected for use shall not be stored on roofs.

6109.7 Storage in basement, pit or similar location. LP-gas containers shall not be stored in a basement, pit or similar location where heavier-than-air gas might collect. LP-gas containers shall not be stored in above-grade underfloor spaces or basements unless such location is provided with an approved means of ventilation.

Exception: Department of Transportation (DOTn) specification cylinders with a maximum water capacity of 2.7 pounds (1.2 kg) for use in completely self-contained hand torches and similar applications. The quantity of LP-gas shall not exceed 20 pounds (9 kg).

6109.8 Protection of valves on LP-gas containers in storage. LP-gas DOTn cylinder valves shall be protected by screw-on-type caps or collars that shall be securely in place on all containers stored regardless of whether they are full, partially full or empty. Container and tank outlet valves shall be closed or plugged.

6109.9 Storage within buildings open to the public. Department of Transportation (DOTn) specification cylinders with maximum water capacity of 2.7 pounds (1.2 kg) used in completely self-contained hand torches and similar applications are allowed to be stored or displayed in a building open to the public. The quantity of LP-gas shall not exceed 200 pounds (91 kg) except as provided in Section 6109.11.

6109.10 Storage within buildings not open to the public. The maximum quantity allowed in one storage location in buildings not open to the public, such as industrial buildings, shall not exceed a water capacity of 735 pounds (334 kg) [nominal 300 pounds (136 kg) of LP-gas]. Where additional storage locations are required on the same floor within the same building, they shall be separated by not less than 300 feet (91 440 mm). Storage beyond these limitations shall comply with Section 6109.11.

6109.10.1 Quantities on equipment and vehicles. LP-gas containers carried as part of service equipment on highway mobile vehicles need not be considered in the total storage capacity in Section 6109.10, provided that such vehicles are stored in private garages and do not carry more than three LP-gas containers with a total aggregate LP-gas capacity not exceeding 100 pounds (45.4 kg) per vehicle. LP-gas container valves shall be closed.

6109.11 Storage within rooms used for gas manufacturing. Storage within buildings or rooms used for gas manufacturing, gas storage, gas-air mixing and vaporization, and compressors not associated with liquid transfer shall comply with Sections 6109.11.1 and 6109.11.2.

6109.11.1 Quantity limits. The maximum quantity of LP-gas shall be 10,000 pounds (4540 kg).

6109.11.2 Construction. The construction of such buildings and rooms shall comply with requirements for Group H occupancies in the *California Building Code*, Chapter 10 of NFPA 58 and both of the following:

1. Adequate vents shall be provided to the outside at both top and bottom, located not less than 5 feet (1524 mm) from building openings.
2. The entire area shall be classified for the purposes of ignition source control in accordance with Section 6.25 of NFPA 58.

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6109.12 Location of storage outside of buildings. Storage outside of buildings of LP-gas containers awaiting use, resale or part of a cylinder exchange program shall be located in accordance with Table 6109.12.

TABLE 6109.12—SEPARATION FROM EXPOSURES OF LP-GAS CONTAINERS AWAITING USE, RESALE OR EXCHANGE STORED OUTSIDE OF BUILDINGS

QUANTITY OF LP-GAS STORED (pounds)	MINIMUM SEPARATION DISTANCE FROM STORED LP-GAS CYLINDERS TO (feet):						
	Nearest important building or group of buildings or line of adjoining property that has the potential to be built on	Line of adjoining property occupied by schools, places of religious worship, hospitals, athletic fields or other points of public gathering; busy thoroughfares; or sidewalks	LP-gas dispensing station	Doorway or opening to a building with two or more means of egress	Doorway or opening to a building with one means of egress	Combustible materials	Motor vehicle fuel dispenser
720 or less	0	0	5	5	10	10	20
721–2,500	0	10	10	5	10	10	20
2,501–6,000	10	10	10	10	10	10	20
6,001–10,000	20	20	20	20	20	10	20
Over 10,000	25	25	25	25	25	10	20

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.

6109.13 Protection of containers. LP-gas containers shall be stored within a suitable enclosure or otherwise protected against tampering. Vehicle impact protection shall be provided as required by Section 6107.4.

Exception: Vehicle impact protection shall not be required for protection of LP-gas containers where the containers are kept in lockable, ventilated cabinets of metal construction.

6109.14 Alternative location and protection of storage. Where the provisions of Sections 6109.12 and 6109.13 are impractical at construction sites, or at buildings or structures undergoing major renovation or repairs, the storage of containers shall be as required by the fire code official.

6109.15 LP-gas cylinder exchange for resale. In addition to other applicable requirements of this chapter, facilities operating LP-gas cylinder exchange stations that are open to the public shall comply with the following requirements.

1. Cylinders shall be secured in a lockable, ventilated metal cabinet or other approved enclosure.
2. Cylinders shall be available only by authorized personnel or by use of an automated exchange system in accordance with Section 6109.15.1.
3. A sign shall be posted on the entry door of the business operating the cylinder exchange stating “DO NOT BRING LP-GAS CYLINDERS INTO THE BUILDING” or similar approved wording.
4. An emergency contact information sign shall be posted within 10 feet (3048 mm) of the cylinder storage cabinet. The content, lettering, size, color and location of the required sign shall be as required by the fire code official.

6109.15.1 Automated cylinder exchange stations. Cylinder exchange stations that include an automated vending system for exchanging cylinders shall comply with the following additional requirements:

1. The vending system shall only permit access to a single cylinder per individual transaction.
2. Cabinets storing cylinders shall be designed such that cylinders can only be placed inside when they are oriented in the upright position.
3. Devices operating door releases for access to stored cylinders shall be permitted to be pneumatic, mechanical or electrically powered.
4. Electrical equipment inside of or within 5 feet (1524 mm) of a cabinet storing cylinders, including but not limited to electronics associated with vending operations, shall comply with the requirements for Class I, Division 2, equipment in accordance with *the California Electrical Code.*
5. A manual override control shall be permitted for use by authorized personnel. On newly installed cylinder exchange stations, the vending system shall not be capable of returning to automatic operation after a manual override until the system has been inspected and reset by authorized personnel.
6. Inspections shall be conducted by authorized personnel to verify that all cylinders are secured, access doors are closed and the station has no visible damage or obvious defects that necessitate placing the station out of service. The frequency of inspections shall be as specified by the fire code official.

SECTION 6110—LP-GAS CONTAINERS NOT IN SERVICE

6110.1 Removed from service. LP-gas containers whose use has been discontinued shall comply with all of the following:

1. Be disconnected from appliance piping.

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2. Have LP-gas container outlets, except relief valves, closed or plugged.
3. Be positioned with the relief valve in direct communication with the LP-gas container vapor space.

6110.2 Removal from site. LP-gas containers discontinued from service shall be removed from the site.

SECTION 6111—PARKING AND GARAGING OF LP-GAS TANK VEHICLES

6111.1 General. Parking of LP-gas tank vehicles shall comply with Sections 6111.2 and 6111.3.

Exception: In cases of accident, breakdown or other emergencies, LP-gas tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

6111.2 Unattended parking. The unattended parking of LP-gas tank vehicles shall be in accordance with Sections 6111.2.1 and 6111.2.2.

6111.2.1 Near residential, educational and institutional occupancies and other high-risk areas. LP-gas tank vehicles shall not be left unattended at any time on residential streets or within 500 feet (152 m) of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Tank vehicles shall not be left unattended at any other place that would, in the opinion of the fire code official, pose an extreme life hazard.

6111.2.2 Durations exceeding 1 hour. LP-gas tank vehicles parked at any one point for longer than 1 hour shall be located as follows:

1. Off public streets, highways, public avenues or public alleys.
2. Inside of a bulk plant.
3. At other approved locations not less than 50 feet (15 240 mm) from buildings other than those approved for the storage or servicing of such vehicles.

6111.3 Garaging. Garaging of LP-gas tank vehicles shall be as specified in NFPA 58. Vehicles with LP-gas fuel systems are allowed to be stored or serviced in garages as specified in Section 11.14 of NFPA 58.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 62 – ORGANIC PEROXIDES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

62

ORGANIC PEROXIDES

User notes:

About this chapter: Chapter 62 addresses the hazards associated with the storage, handling and use of organic peroxides and is intended to manage the fire and oxidation hazards of organic peroxides by preventing their uncontrolled release. These chemicals possess the characteristics of flammable or combustible liquids and are also strong oxidizers. This unusual combination of properties requires special storage and handling precautions to prevent uncontrolled release, contamination, hazardous chemical reactions, fires or explosions. The requirements of this chapter pertain to industrial applications in which significant quantities of organic peroxides are stored or used; however, smaller quantities of organic peroxides still pose a significant hazard and, therefore, must be stored and used in accordance with the applicable provisions of this chapter and Chapter 50.

SECTION 6201—GENERAL

6201.1 Scope. The storage and use of organic peroxides shall be in accordance with this chapter and Chapter 50.

Unclassified detonable organic peroxides that are capable of detonation in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6201.2 Permits. Permits shall be required for organic peroxides as set forth in Section 105.5.

SECTION 6202—DEFINITION

6202.1 Definition. The following term is defined in Chapter 2:

ORGANIC PEROXIDE.

Class I.

Class II.

Class III.

Class IV.

Class V.

Unclassified detonable.

SECTION 6203—GENERAL REQUIREMENTS

6203.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of organic peroxides in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6201 and 6203.

6203.1.1 Special limitations for indoor storage and use by occupancy. The indoor storage and use of organic peroxides shall be in accordance with Sections 6203.1.1.1 through 6203.1.1.4.

6203.1.1.1 Group A, E, I or U occupancies. In Group A, E, I or U occupancies, any amount of unclassified detonable and Class I organic peroxides shall be stored in accordance with the following:

1. Unclassified detonable and Class I organic peroxides shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6203.1.1.2 Group R occupancies. Unclassified detonable and Class I organic peroxides shall not be stored or used within Group R occupancies.

6203.1.1.3 Group B, F, M or S occupancies. Unclassified detonable and Class I organic peroxides shall not be stored or used in offices, or retail sales areas of Group B, F, M or S occupancies.

6203.1.1.4 Classrooms. In classrooms in Group B, F or M occupancies, any amount of unclassified detonable and Class I organic peroxides shall be stored in accordance with the following:

1. Unclassified detonable and Class I organic peroxides shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6203.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of organic peroxides in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

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SECTION 6204—STORAGE

6204.1 Indoor storage. Indoor storage of organic peroxides in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

Indoor storage of unclassified detonable organic peroxides that are capable of detonation in their normal shipping containers under conditions of fire exposure shall be stored in accordance with Chapter 56.

6204.1.1 Detached storage. Storage of organic peroxides shall be in detached buildings where required by Section 5003.8.2.

6204.1.2 Distance from detached buildings to exposures. In addition to the requirements of the *California Building Code*, detached storage buildings for Class I, II, III, IV and V organic peroxides shall be located in accordance with Table 6204.1.2. Detached buildings containing quantities of unclassified detonable organic peroxides in excess of those set forth in Table 5003.8.2 shall be located in accordance with Table 5604.5.2(1).

TABLE 6204.1.2—ORGANIC PEROXIDES—DISTANCE TO EXPOSURES FROM DETACHED STORAGE BUILDINGS OR OUTDOOR STORAGE AREAS

ORGANIC PEROXIDE CLASS	MAXIMUM STORAGE QUANTITY (POUNDS) AT MINIMUM SEPARATION DISTANCE					
	Distance to buildings, lot lines, public streets, public alleys, public ways or means of egress			Distance between individual detached storage buildings or individual outdoor storage areas		
	50 feet	100 feet	150 feet	20 feet	75 feet	100 feet
I	2,000	20,000	175,000	2,000	20,000	175,000
II	100,000	200,000	No Limit	100,000[a]	No Limit	No Limit
III	200,000	No Limit	No Limit	200,000[a]	No Limit	No Limit
IV	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit
V	No Limit	No Limit	No Limit	No Limit	No Limit	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg.
a. Where the amount of organic peroxide stored exceeds this amount, the minimum separation shall be 50 feet.

6204.1.3 Liquid-tight floor. In addition to the requirements of Section 5004.12, floors of storage areas shall be of liquid-tight construction.

6204.1.4 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in storage areas for Class I or II organic peroxides shall comply with the requirements for electrical Class I, Division 2, locations.

6204.1.5 Smoke detection. An approved supervised smoke detection system in accordance with Section 907 shall be provided in rooms or areas where Class I, II or III organic peroxides are stored. Activation of the smoke detection system shall sound a local alarm.

Exception: A smoke detection system shall not be required in detached storage buildings equipped throughout with an approved automatic fire-extinguishing system complying with Chapter 9.

6204.1.6 Maximum quantities. Maximum allowable quantities per building in a mixed occupancy building shall not exceed the amounts set forth in Table 5003.8.2. Maximum allowable quantities per building in a detached storage building shall not exceed the amounts specified in Table 6204.1.2.

6204.1.7 Storage arrangement. Storage arrangements for organic peroxides shall be in accordance with Table 6204.1.7 and shall comply with all of the following:

1. Containers and packages in storage areas shall be closed.
2. Bulk storage shall not be in piles or bins.
3. A minimum 2-foot (610 mm) clear space shall be maintained between storage and uninsulated metal walls.
4. Fifty-five-gallon (208 L) drums shall not be stored more than one drum high.

TABLE 6204.1.7—STORAGE OF ORGANIC PEROXIDES

ORGANIC PEROXIDE CLASS	PILE CONFIGURATION				MAXIMUM QUANTITY PER BUILDING
	Maximum width (feet)	Maximum height (feet)	Minimum distance to next pile (feet)	Minimum distance to walls (feet)	
I	6	8	4[a]	4[b]	Note c
II	10	8	4[a]	4[b]	Note c
III	10	8	4[a]	4[b]	Note c
IV	16	10	3[a, d]	4[b]	No Requirement
V	No Requirement	No Requirement	No Requirement	No Requirement	No Requirement

For SI: 1 foot = 304.8 mm.
a. Not less than one main aisle with a minimum width of 8 feet shall divide the storage area.
b. Distance to noncombustible walls is allowed to be reduced to 2 feet.
c. See Table 6204.1.2 for maximum quantities.
d. The distance shall be not less than one-half the pile height.

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6204.1.8 Location in building. The storage of Class I or II organic peroxides shall be on the ground floor. Class III organic peroxides shall not be stored in basements.

6204.1.9 Contamination. Organic peroxides shall be stored in their original DOTn shipping containers. Organic peroxides shall be stored in a manner to prevent contamination.

6204.1.10 Explosion control. Indoor storage rooms, areas and buildings containing unclassified detonable and Class I organic peroxides shall be provided with explosion control in accordance with Section 911.

6204.1.11 Standby power. Standby power shall be provided in accordance with Section 1203 for the following systems used to protect Class I and unclassified detonable organic peroxides:

1. Exhaust ventilation system.
2. Treatment system.
3. Smoke detection system.
4. Temperature control system.
5. Fire alarm system.
6. Emergency alarm system.

6204.1.11.1 Fail-safe engineered systems. Standby power shall not be required for mechanical exhaust ventilation, treatment systems and temperature control systems where approved fail-safe engineered systems are installed.

6204.2 Outdoor storage. Outdoor storage of organic peroxides in amounts exceeding the maximum allowable quantities per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

6204.2.1 Distance from storage to exposures. Outdoor storage areas for organic peroxides shall be located in accordance with Table 6204.1.2.

6204.2.2 Electrical wiring and equipment. In addition to the requirements of Section 5003.9.4, electrical wiring and equipment in outdoor storage areas containing unclassified detonable, Class I or Class II organic peroxides shall comply with the requirements for electrical Class I, Division 2, locations.

6204.2.3 Maximum quantities. Maximum quantities of organic peroxides in outdoor storage shall be in accordance with Table 6204.1.2.

6204.2.4 Storage arrangement. Storage arrangements shall be in accordance with Table 6204.1.7.

6204.2.5 Separation. In addition to the requirements of Section 5003.9.8, outdoor storage areas for organic peroxides in amounts exceeding those specified in Table 5003.8.2 shall be located a minimum distance of 50 feet (15 240 mm) from other hazardous material storage.

SECTION 6205—USE

6205.1 General. The use of organic peroxides in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 63 – OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

63

OXIDIZERS, OXIDIZING GASES AND OXIDIZING CRYOGENIC FLUIDS

User notes:

About this chapter: Chapter 63 addresses the hazards associated with solid, liquid, gaseous and cryogenic fluid oxidizing materials, including oxygen in home use, and establishes criteria for their safe storage and protection in indoor and outdoor storage facilities, minimizing the potential for uncontrolled releases and contact with fuel sources. Although oxidizers themselves do not burn, they pose unique fire hazards because of their ability to support combustion by breaking down and giving off oxygen.

SECTION 6301—GENERAL

6301.1 Scope. The storage and use of oxidizing materials shall be in accordance with this chapter and Chapter 50. Oxidizing gases shall also comply with Chapter 53. Oxidizing cryogenic fluids shall also comply with Chapter 55.

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Bulk oxygen systems at industrial and institutional consumer sites shall be in accordance with NFPA 55.
3. Liquid oxygen stored or used in home health care in Group I-1, I-4 and R occupancies in accordance with Section 6306.

6301.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6302—DEFINITIONS

6302.1 Definitions. The following terms are defined in Chapter 2:

BULK OXYGEN SYSTEM.

LIQUID OXYGEN AMBULATORY CONTAINER.

LIQUID OXYGEN HOME CARE CONTAINER.

OXIDIZER.

Class 4.

Class 3.

Class 2.

Class 1.

OXIDIZING CRYOGENIC FLUID.

OXIDIZING GAS.

SECTION 6303—GENERAL REQUIREMENTS

6303.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of oxidizing materials in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6301 and 6303. Oxidizing gases shall also comply with Chapter 53.

6303.1.1 Special limitations for indoor storage and use by occupancy. The indoor storage and use of oxidizing materials shall be in accordance with Sections 6303.1.1.1 through 6303.1.1.2.

6303.1.1.1 Class 4 liquid and solid oxidizers. The storage and use of Class 4 liquid and solid oxidizers shall comply with Sections 6303.1.1.1.1 through 6303.1.1.1.4.

6303.1.1.1.1 Group A, E, I or U occupancies. In Group A, E, I or U occupancies, any amount of Class 4 liquid and solid oxidizers shall be stored in accordance with the following:

1. Class 4 liquid and solid oxidizers shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. The hazardous materials storage cabinets shall not contain other storage.

6303.1.1.1.2 Group R occupancies. Class 4 liquid and solid oxidizers shall not be stored or used within Group R occupancies.

6303.1.1.1.3 Offices and retail sales areas. Class 4 liquid and solid oxidizers shall not be stored or used in offices or retail sales areas of Group B, F, M or S occupancies.

6303.1.1.1.4 Classrooms. In classrooms of Group B, F or M occupancies, any amount of Class 4 liquid and solid oxidizers shall be stored in accordance with the following:

1. Class 4 liquid and solid oxidizers shall be stored in hazardous materials storage cabinets complying with Section 5003.8.7.
2. Hazardous materials storage cabinets shall not contain other storage.

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6303.1.1.2 Oxidizing gases. Except for cylinders of nonliquefied compressed gases not exceeding a capacity of 250 cubic feet (7 m^3) or liquefied compressed gases not exceeding a capacity of 46 pounds (21 kg) each used for maintenance purposes, patient care or operation of equipment, oxidizing gases shall not be stored or used in Group A, E, I or R occupancies or in offices in Group B occupancies.

The aggregate quantities of gases used for maintenance purposes and operation of equipment shall not exceed the maximum allowable quantity per control area listed in Table 5003.1.1(1).

Medical gas systems and medical gas supply cylinders shall also be in accordance with Section 5306.

6303.1.2 Emergency shutoff. Compressed gas systems conveying oxidizing gases shall be provided with approved manual or automatic emergency shutoff valves that can be activated at each point of use and at each source.

6303.1.2.1 Shutoff at source. A manual or automatic fail-safe emergency shutoff valve shall be installed on supply piping at the cylinder or bulk source. Manual or automatic cylinder valves are allowed to be used as the required emergency shutoff valve where the source of supply is limited to unmanifolded cylinder sources.

6303.1.2.2 Shutoff at point of use. A manual or automatic emergency shutoff valve shall be installed on the supply piping at the point of use or at a point where the equipment using the gas is connected to the supply system.

6303.1.3 Ignition source control. Ignition sources in areas containing oxidizing gases shall be controlled in accordance with Section 5003.7.

6303.1.4 Class 1, 2 and 3 oxidizer storage configuration. The storage configuration of Class 1, 2 and 3 liquid and solid oxidizers shall be as set forth in Table 6303.1.4.

TABLE 6303.1.4—STORAGE OF CLASS 1, 2 AND 3 OXIDIZER LIQUIDS AND SOLIDS

STORAGE CONFIGURATION	LIMITS (feet)		
	Class 1	Class 2	Class 3
Piles			
Maximum width	24	16	12
Maximum height	20	Note c	Note c
Maximum distance to aisle	12	8	8
Minimum distance to next pile	4[a]	Note a	Note a
Minimum distance to walls	2[b]	2	4
Maximum quantity per pile	200 tons	MAQ	NA
Maximum quantity per building	No Limit	Note d	Note d

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 ton = 0.907185 metric ton.
MAQ = Maximum Allowable Quantity.
NA = Not Applicable.
a. The minimum aisle width shall be equal to the pile height, but not less than 4 feet and not greater than 8 feet.
b. There shall not be a minimum distance from the pile to a wall for amounts less than 9,000 pounds.
c. Maximum storage height in nonsprinklered buildings is limited to 6 feet. In sprinklered buildings, see NFPA 400 for storage heights based on ceiling sprinkler protection.
d. Maximum quantity per building varies. See Chapter 50 for control areas and MAQs.

6303.1.5 Class 3 liquid and solid oxidizers. Not more than 220 pounds (99 kg) of solid or 22 gallons (83 L) of liquid Class 3 oxidizer is allowed in storage and use where such materials are necessary for maintenance purposes or operation of equipment. The oxidizers shall be stored in approved containers and in an approved manner.

SECTION 6304—STORAGE

6304.1 Indoor storage. Indoor storage of oxidizing materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003 and 5004 and this chapter.

6304.1.1 Explosion control. Indoor storage rooms, areas and buildings containing Class 4 liquid or solid oxidizers shall be provided with explosion control in accordance with Section 911.

6304.1.2 Automatic sprinkler system. The automatic sprinkler system for oxidizer storage shall be designed in accordance with NFPA 400.

6304.1.3 Liquid-tight floor. In addition to Section 5004.12, floors of storage areas for liquid and solid oxidizers shall be of liquid-tight construction.

6304.1.4 Smoke detection. An approved supervised smoke detection system in accordance with Section 907 shall be installed in liquid and solid oxidizer storage areas. Activation of the smoke detection system shall sound a local alarm.

Exception: Detached storage buildings protected by an approved automatic fire-extinguishing system.

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6304.1.5 Storage conditions. The maximum quantity of oxidizers per building in storage buildings shall not exceed those quantities set forth in Tables 6304.1.5(1) through 6304.1.5(3).

The storage configuration for liquid and solid oxidizers shall be as set forth in Table 6303.1.4 and Tables 6304.1.5(1) through 6304.1.5(3).

Class 2 oxidizers shall not be stored in basements except where such storage is in stationary tanks.

Class 3 and 4 oxidizers in amounts exceeding the maximum allowable quantity per control area set forth in Section 5003.1 shall be stored on the ground floor only.

TABLE 6304.1.5(1)—STORAGE OF CLASS 2 OXIDIZER LIQUIDS AND SOLIDS

STORAGE CONFIGURATION	LIMITS	
	Group H occupancy storage	Detached storage
Piles		
Maximum width	25 feet	25 feet
Maximum height	Note a	Note a
Maximum distance to aisle	12 feet	12 feet
Minimum distance to next pile	Note b	Note b
Minimum distance to walls	2 feet[c]	2 feet[c]
Maximum quantity per pile	100 tons	100 tons
Maximum quantity per building	2,000 tons	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 ton = 0.907185 metric ton.

a. Maximum storage height in nonsprinklered buildings is limited to 6 feet. In sprinklered buildings see NFPA 400 for storage heights based on ceiling sprinkler protection.

b. The minimum aisle width shall be equal to the pile height, but not less than 4 feet and not greater than 8 feet.

c. For protection level and detached storage under 4,500 pounds, there shall not be a minimum separation distance between the pile and any wall.

TABLE 6304.1.5(2)—STORAGE OF CLASS 3 OXIDIZER LIQUIDS AND SOLIDS

STORAGE CONFIGURATION	LIMITS	
	Group H occupancy storage	Detached storage
Piles		
Maximum width	16 feet	20 feet
Maximum height	Note a	Note a
Maximum distance to aisle	10 feet	10 feet
Minimum distance to next pile	Note b	Note b
Minimum distance to walls	4 feet[c]	4 feet[c]
Maximum quantity per pile	30 tons	100 tons
Maximum quantity per building	1,200 tons	No Limit

For SI: 1 foot = 304.8 mm, 1 pound = 0.454 kg, 1 ton = 0.907185 metric ton.

a. Maximum storage height in nonsprinklered buildings is limited to 6 feet. In sprinklered buildings see NFPA 400 for storage heights based on ceiling sprinkler protection.

b. The minimum aisle width shall be equal to the pile height, but not less than 4 feet and not greater than 8 feet.

c. For protection level and detached storage under 2,300 pounds, there shall not be a minimum separation distance between the pile and any wall.

TABLE 6304.1.5(3)—STORAGE OF CLASS 4 OXIDIZER LIQUIDS AND SOLIDS

STORAGE CONFIGURATION	LIMITS (feet)
Piles	
Maximum length	10
Maximum width	4
Maximum height	8
Minimum distance to next pile	8
Maximum quantity per building	No Limit

For SI: 1 foot = 304.8 mm.

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6304.1.6 Separation of Class 4 oxidizers from other materials. In addition to the requirements in Section 5003.9.8, Class 4 oxidizer liquids and solids shall be separated from other hazardous materials by not less than a 1-hour fire barrier or stored in hazardous materials storage cabinets.

6304.1.7 Contamination. Liquid and solid oxidizers shall not be stored on or against combustible surfaces. Liquid and solid oxidizers shall be stored in a manner to prevent contamination.

6304.1.8 Detached storage. Storage of liquid and solid oxidizers shall be in detached buildings where required by Section 5003.8.2.

6304.1.8.1 Separation distance. Detached storage buildings for Class 4 oxidizer liquids and solids shall be located not less than 50 feet (15 240 mm) from other hazardous materials storage.

6304.2 Outdoor storage. Outdoor storage of oxidizing materials in amounts exceeding the maximum allowable quantities per control area set forth in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter. Oxidizing gases shall also comply with Chapter 53.

6304.2.1 Distance from storage to exposures for oxidizing gases. Outdoor storage areas for oxidizing gases shall be located in accordance with Table 6304.2.1.

TABLE 6304.2.1—OXIDIZER GASES—DISTANCE FROM STORAGE TO EXPOSURES[a]

QUANTITY OF GAS STORED (cubic feet at NTP)	DISTANCE TO A BUILDING NOT ASSOCIATED WITH THE MANUFACTURE OR DISTRIBUTION OF OXIDIZING GASES OR PUBLIC WAY OR LOT LINE THAT CAN BE BUILT ON (feet)	DISTANCE BETWEEN STORAGE AREAS (feet)
0–50,000	5	5
50,001–100,000	10	10
100,001 or greater	15	10

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3.

a. The minimum required distances shall not apply where fire barriers without openings or penetrations having a minimum fire-resistance rating of 2 hours interrupt the line of sight between the storage and the exposure. The configuration of the fire barrier shall be designed to allow natural ventilation to prevent the accumulation of hazardous gas concentrations.

6304.2.1.1 Oxidizing cryogenic fluids. Outdoor storage areas for oxidizing cryogenic fluids shall be located in accordance with Chapter 55.

6304.2.2 Storage configuration for liquid and solid oxidizers. Storage configuration for liquid and solid oxidizers shall be in accordance with Table 6303.1.4 and Tables 6304.1.5(1) through 6304.1.5(3).

6304.2.3 Storage configuration for oxidizing gases. Storage configuration for oxidizing gases shall be in accordance with Table 6304.2.1.

SECTION 6305—USE

6305.1 Scope. The use of oxidizers in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter. Oxidizing gases shall also comply with Chapter 53.

SECTION 6306—LIQUID OXYGEN IN HOME HEALTH CARE

6306.1 General. The storage and use of liquid oxygen (LOX) in home health care in Group I-1, I-4 and R occupancies shall comply with Sections 6306.2 through 6306.6, or shall be stored and used in accordance with Chapter 50.

6306.2 Information and instructions to be provided. The seller of liquid oxygen shall provide the user with information in written form that includes, but is not limited to, the following:

1. Manufacturer's instructions and labeling for safe storage and use of the containers.
2. Locating containers away from ignition sources, exits, electrical hazards and high-temperature devices in accordance with Section 6306.3.3.
3. Restraint of containers to prevent falling in accordance with Section 6306.3.4.
4. Requirements for handling containers in accordance with Section 6306.3.5.
5. Safeguards for refilling containers in accordance with Section 6306.3.6.
6. Signage requirements in accordance with Section 6306.6.

6306.3 Liquid oxygen home care containers. Containers of liquid oxygen in home health care shall be in accordance with Sections 6306.3.1 through 6306.3.6.3.

6306.3.1 Maximum individual container capacity. Liquid oxygen home care containers shall not exceed an individual capacity of 15.8 gallons (60 L) in Group I-1, I-4 and R occupancies. Liquid oxygen ambulatory containers are allowed in Group I-1, I-4 and R

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occupancies. Containers of liquid oxygen in home health care shall also be stored, used and filled in accordance with Section 6306 and Sections 5503.1 and 5503.2.

6306.3.2 Manufacturer's instructions and labeling. Containers shall be stored, used and operated in accordance with the manufacturer's instructions and labeling.

6306.3.3 Locating containers. Containers shall not be located in areas where any of the following conditions exist:

1. They can be overturned due to operation of a door.
2. They are in the direct path of egress.
3. They are subject to falling objects.
4. They can become part of an electrical circuit.
5. Open flames and high-temperature devices can cause a hazard.

6306.3.4 Restraining containers. Liquid oxygen home care containers shall be restrained while in storage or use to prevent falling caused by contact, vibration or seismic activity. Containers shall be restrained by one of the following methods:

1. Restraining containers to a fixed object with one or more restraints.
2. Restraining containers within a framework, stand or assembly designed to secure the container.
3. Restraining containers by locating a container against two points of contact such as the walls of a corner of a room or a wall and a secure furnishing or object such as a desk.

6306.3.5 Container handling. Containers shall be handled by use of a cart or hand truck designed for such use.

Exceptions:

1. Liquid oxygen home care containers equipped with a roller base.
2. Liquid oxygen ambulatory containers are allowed to be hand carried.

6306.3.6 Filling of containers. The filling of containers shall be in accordance with Sections 6306.3.6.1 through 6306.3.6.3.

6306.3.6.1 Filling location. Liquid oxygen home care containers and ambulatory containers shall be filled outdoors.

Exception: Liquid oxygen ambulatory containers are allowed to be filled indoors where the supply container is specifically designed for filling such containers and written instructions are provided by the container manufacturer.

6306.3.6.2 Incompatible surfaces. A drip pan compatible with liquid oxygen shall be provided under home care container fill and vent connections during the filling process in order to protect against liquid oxygen spillage from coming into contact with combustible surfaces, including asphalt.

6306.3.6.3 Open flames and high-temperature devices. The use of open flames and high-temperature devices shall be in accordance with Section 5003.7.2.

6306.4 Maximum aggregate quantity. The maximum aggregate quantity of liquid oxygen allowed in storage and in use in each *dwelling unit* shall be 31.6 gallons (120 L).

Exceptions:

1. The maximum aggregate quantity of liquid oxygen allowed in Group I-4 occupancies shall be limited by the maximum allowable quantity set forth in Table 5003.1.1(1).
2. Where individual sleeping rooms are separated from the remainder of the dwelling unit by fire barriers constructed in accordance with Section 707 of the *California Building Code*, and horizontal assemblies constructed in accordance with Section 711 of the *California Building Code*, or both, having a minimum fire-resistance rating of 1 hour, the maximum aggregate quantity per dwelling unit shall be increased to allow not more than 31.6 gallons (120 L) of liquid oxygen per sleeping room.

6306.5 Smoking prohibited. Smoking shall be prohibited in rooms or areas where liquid oxygen is in use.

6306.6 Signs. Warning signs for occupancies using home health care liquid oxygen shall be in accordance with Sections 6306.6.1 and 6306.6.2.

6306.6.1 No smoking sign. A sign stating "OXYGEN— NO SMOKING" shall be posted in each room or area where liquid oxygen containers are stored, used or filled.

6306.6.2 Premises signage. Where required by the fire code official, each dwelling unit or sleeping unit shall have an approved sign indicating that the unit contains liquid oxygen home care containers.

6306.7 Fire department notification. Where required by the fire code official, the liquid oxygen seller shall notify the fire department of the locations of liquid oxygen home care containers.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 64 – PYROPHORIC MATERIALS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD					BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

64

PYROPHORIC MATERIALS

User notes:

About this chapter: Chapter 64 regulates the hazards associated with pyrophoric materials, which are capable of spontaneously igniting in the air at or below a temperature of 130°F (54°C). Many pyrophoric materials also pose severe flammability or reactivity hazards. This chapter addresses only the hazards associated with pyrophoric materials. Materials that pose multiple hazards must conform to the requirements of this code with respect to all hazards.

SECTION 6401—GENERAL

6401.1 Scope. The storage and use of pyrophoric materials shall be in accordance with this chapter. Compressed gases shall also comply with Chapter 53.

6401.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6402—DEFINITION

6402.1 Definition. The following term is defined in Chapter 2:

PYROPHORIC.

SECTION 6403—GENERAL REQUIREMENTS

6403.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of pyrophoric materials in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6401 and 6403.

6403.1.1 Emergency shutoff. Compressed gas systems conveying pyrophoric gases shall be provided with approved manual or automatic emergency shutoff valves that can be activated at each point of use and at each source.

6403.1.1.1 Shutoff at source. An automatic emergency shutoff valve shall be installed on supply piping at the cylinder or bulk source. The shutoff valve shall be operated by a remotely located manually activated shutdown control located not less than 15 feet (4572 mm) from the source of supply. Manual or automatic cylinder valves are allowed to be used as the required emergency shutoff valve where the source of supply is limited to unmanifolded cylinder sources.

6403.1.1.2 Shutoff at point of use. A manual or automatic emergency shutoff valve shall be installed on the supply piping at the point of use or at a point where the equipment using the gas is connected to the supply system.

6403.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

SECTION 6404—STORAGE

6404.1 Indoor storage. Indoor storage of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003 and 5004 and this chapter.

The storage of silane gas, and gas mixtures with a silane concentration of 1.37 percent or more by volume, shall be in accordance with ANSI/CGA G-13.

6404.1.1 Liquid-tight floor. In addition to the requirements of Section 5004.12, floors of storage areas containing pyrophoric liquids shall be of liquid-tight construction.

6404.1.2 Pyrophoric solids and liquids. Storage of pyrophoric solids and liquids shall be limited to a maximum area of 100 square feet (9.3 m^2) per pile. Storage shall not exceed 5 feet (1524 mm) in height. Individual containers shall not be stacked.

Aisles between storage piles shall be not less than 10 feet (3048 mm) in width.

Individual tanks or containers shall not exceed 500 gallons (1893 L) in capacity.

6404.1.3 Pyrophoric gases. Storage of pyrophoric gases shall be in detached buildings where required by Section 5003.8.2.

6404.1.4 Separation from incompatible materials. In addition to the requirements of Section 5003.9.8, indoor storage of pyrophoric materials shall be isolated from incompatible hazardous materials by 1-hour fire barriers with openings protected in accordance with the *California Building Code.*

Exception: Storage in approved hazardous materials storage cabinets constructed in accordance with Section 5003.8.7.

6404.2 Outdoor storage. Outdoor storage of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003 and 5004, and this chapter.

The storage of silane gas, and gas mixtures with a silane concentration of 1.37 percent or more by volume, shall be in accordance with ANSI/CGA G-13.

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6404.2.1 Distance from storage to exposures. The separation of pyrophoric solids, liquids and gases from buildings, lot lines, public streets, public alleys, public ways or means of egress shall be in accordance with the following:

1. Solids and liquids. Two times the separation required by Chapter 57 for Class IB flammable liquids.
2. Gases. The location and maximum amount of pyrophoric gas per storage area shall be in accordance with Table 6404.2.1.

TABLE 6404.2.1—PYROPHORIC GASES—DISTANCE FROM STORAGE TO EXPOSURES[a]

MAXIMUM AMOUNT PER STORAGE AREA (cubic feet)	MINIMUM DISTANCE BETWEEN STORAGE AREAS (feet)	MINIMUM DISTANCE TO LOT LINES OF PROPERTY THAT CAN BE BUILT ON (feet)	MINIMUM DISTANCE TO PUBLIC STREETS, PUBLIC ALLEYS OR PUBLIC WAYS (feet)	MINIMUM DISTANCE TO BUILDINGS ON THE SAME PROPERTY		
				Nonrated construction or openings within 25 feet	Two-hour construction and no openings within 25 feet	Four-hour construction and no openings within 25 feet
250	5	25	5	5	0	0
2,500	10	50	10	10	5	0
7,500	20	100	20	20	10	0

For SI: 1 foot = 304.8 mm, 1 cubic foot = 0.02832 m^3.

a. The minimum required distances shall be reduced to 5 feet where protective structures having a minimum fire resistance of 2 hours interrupt the line of sight between the container and the exposure. The protective structure shall be not less than 5 feet from the exposure. The configuration of the protective structure shall allow natural ventilation to prevent the accumulation of hazardous gas concentrations.

6404.2.2 Weather protection. Where overhead construction is provided for sheltering outdoor storage areas of pyrophoric materials, the storage areas shall be provided with approved automatic fire-extinguishing system protection.

SECTION 6405—USE

6405.1 General. The use of pyrophoric materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

6405.2 Weather protection. Where overhead construction is provided for sheltering of outdoor use areas of pyrophoric materials, the use areas shall be provided with approved automatic fire-extinguishing system protection.

6405.3 Silane gas. The use of silane gas, and gas mixtures with a silane concentration of 1.37 percent or more by volume, shall be in accordance with ANSI/CGA G-13.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 65 – PYROXYLIN (CELLULOSE NITRATE) PLASTICS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

65

PYROXYLIN (CELLULOSE NITRATE) PLASTICS

User notes:

About this chapter: Chapter 65 addresses the significant hazards associated with pyroxylin (cellulose nitrate) plastics, which are the most dangerous and unstable of all plastic compounds. The chemically bound oxygen in their structure permits them to burn vigorously in the absence of atmospheric oxygen at a rate 15 times greater than comparable common combustibles. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the hazards associated with pyroxylin (cellulose nitrate) plastics in a fire or other emergencies.

SECTION 6501—GENERAL

6501.1 Scope. This chapter shall apply to the storage and handling of plastic substances, materials or compounds with cellulose nitrate (pyroxylin) as a base, by whatever name known, in the form of blocks, sheets, tubes or fabricated shapes.

Cellulose nitrate (pyroxylin) motion picture film shall comply with the requirements of Section 306.

6501.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6502—DEFINITIONS

6502.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 6503—GENERAL REQUIREMENTS

6503.1 Displays. Cellulose nitrate (pyroxylin) plastic articles are allowed to be placed on tables not more than 3 feet (914 mm) wide and 10 feet (3048 mm) long. Tables shall be spaced not less than 3 feet (914 mm) apart. Where articles are displayed on counters, they shall be arranged in a like manner.

6503.2 Space under tables. Spaces underneath tables shall be kept free from storage of any kind and accumulation of paper, refuse and other combustible material.

6503.3 Location. Sales or display tables shall be so located that in the event of a fire at the table, the table will not interfere with free means of egress from the room in not less than one direction.

6503.4 Lighting. Lighting shall not be located directly above cellulose nitrate (pyroxylin) plastic material, unless provided with a suitable guard to prevent heated particles from falling.

SECTION 6504—STORAGE AND HANDLING

6504.1 Raw material. Raw cellulose nitrate (pyroxylin) plastic material in a Group F building shall be stored and handled in accordance with Sections 6504.1.1 through 6504.1.7.

6504.1.1 Storage of incoming material. Where raw material in excess of 25 pounds (11 kg) is received in a building or fire area, an approved vented cabinet or approved vented vault equipped with an approved automatic sprinkler system shall be provided for the storage of material.

6504.1.2 Capacity limitations. Cabinets in any one workroom shall not contain more than 1,000 pounds (454 kg) of raw material. Each cabinet shall not contain more than 500 pounds (227 kg). Each compartment shall not contain more than 250 pounds (114 kg).

6504.1.3 Storage of additional material. Raw material in excess of that allowed by Section 6504.1.2 shall be kept in vented vaults not exceeding 1,500-cubic-foot capacity (43 m^3) of total vault space, and with approved construction, venting and sprinkler protection.

6504.1.4 Heat sources. Cellulose nitrate (pyroxylin) plastic shall not be stored within 2 feet (610 mm) of heat-producing appliances, steam pipes, radiators or chimneys.

6504.1.5 Accumulation of material. In factories manufacturing articles of cellulose nitrate (pyroxylin) plastics, approved sprinklered and vented cabinets, vaults or storage rooms shall be provided to prevent the accumulation in workrooms of raw stock in process or finished articles.

6504.1.6 Operators. In workrooms of cellulose nitrate (pyroxylin) plastic factories, operators shall not be stationed closer together than 3 feet (914 mm), and the amount of material per operator shall not exceed one shift's supply and shall be limited to the capacity of three tote boxes, including material awaiting removal or use.

6504.1.7 Waste material. Waste cellulose nitrate (pyroxylin) plastic materials such as shavings, chips, turnings, sawdust, edgings and trimmings shall be kept under water in metal receptacles until removed from the premises.

6504.2 Fire protection. The manufacture or storage of articles of cellulose nitrate (pyroxylin) plastic in quantities exceeding 100 pounds (45 kg) shall be located in a building or portion thereof equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

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6504.3 Sources of ignition. Sources of ignition shall not be located in rooms in which cellulose nitrate (pyroxylin) plastic in excess of 25 pounds (11 kg) is handled or stored.

6504.4 Heating. Rooms in which cellulose nitrate (pyroxylin) plastic is handled or stored shall be heated by low-pressure steam or hot water radiators.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 66 – UNSTABLE (REACTIVE) MATERIALS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

66 UNSTABLE (REACTIVE) MATERIALS

User notes:

About this chapter: Chapter 66 addresses the hazards of unstable (reactive) liquid and solid materials as well as unstable (reactive) compressed gases. In addition to their unstable reactivity, these materials may pose other hazards, such as toxicity, corrosivity, explosivity, flammability or oxidizing potential. This chapter, however, is intended to address those materials whose primary hazard is unstable reactivity. Materials that pose multiple hazards must conform to the requirements of the code with respect to all hazards. Strict compliance with the provisions of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the exposure hazards associated with unstable (reactive) materials in a fire or other emergency.

SECTION 6601—GENERAL

6601.1 Scope. The storage and use of unstable (reactive) materials shall be in accordance with this chapter. Compressed gases shall also comply with Chapter 53.

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable unstable (reactive) materials shall be stored in accordance with Chapter 56.

6601.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6602—DEFINITION

6602.1 Definition. The following term is defined in Chapter 2:

UNSTABLE (REACTIVE) MATERIAL.

Class 4.

Class 3.

Class 2.

Class 1.

SECTION 6603—GENERAL REQUIREMENTS

6603.1 Quantities not exceeding the maximum allowable quantity per control area. Quantities of unstable (reactive) materials not exceeding the maximum allowable quantity per control area shall be in accordance with Sections 6603.1.1 through 6603.1.2.5.

6603.1.1 General. The storage and use of unstable (reactive) materials in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6601 and 6603.

6603.1.2 Limitations for indoor storage and use by occupancy. The indoor storage of unstable (reactive) materials shall be in accordance with Sections 6603.1.2.1 through 6603.1.2.5.

6603.1.2.1 Group A, E, I or U occupancies. In Group A, E, I or U occupancies, any amount of Class 3 and 4 unstable (reactive) materials shall be stored in accordance with the following:

1. Class 3 and 4 unstable (reactive) materials shall be stored in hazardous material storage cabinets complying with Section 5003.8.7.
2. The hazardous material storage cabinets shall not contain other storage.

6603.1.2.2 Group R occupancies. Class 3 and 4 unstable (reactive) materials shall not be stored or used within Group R occupancies.

6603.1.2.3 Group M occupancies. Class 4 unstable (reactive) materials shall not be stored or used in retail sales portions of Group M occupancies.

6603.1.2.4 Offices. Class 3 and 4 unstable (reactive) materials shall not be stored or used in offices of Group B, F, M or S occupancies.

6603.1.2.5 Classrooms. In classrooms in Group B, F or M occupancies, any amount of Class 3 and 4 unstable (reactive) materials shall be stored in accordance with the following:

1. Class 3 and 4 unstable (reactive) materials shall be stored in hazardous material storage cabinets complying with Section 5003.8.7.
2. The hazardous material storage cabinets shall not contain other storage.

6603.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of unstable (reactive) materials in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

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SECTION 6604—STORAGE

6604.1 Indoor storage. Indoor storage of unstable (reactive) materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

In addition, Class 3 and 4 unstable (reactive) detonable materials shall be stored in accordance with the *California Building Code* requirements for explosives.

6604.1.1 Detached storage. Storage of unstable (reactive) materials shall be in detached buildings where required in Section 5003.8.2.

6604.1.2 Explosion control. Indoor storage rooms, areas and buildings containing Class 3 or 4 unstable (reactive) materials shall be provided with explosion control in accordance with Section 911.

6604.1.3 Liquid-tight floor. In addition to Section 5004.12, floors of storage areas for liquids and solids shall be of liquid-tight construction.

6604.1.4 Storage configuration. Unstable (reactive) materials stored in quantities greater than 500 cubic feet (14 m^3) shall be separated into piles, each not larger than 500 cubic feet (14 m^3). Aisle width shall be not less than the height of the piles or 4 feet (1219 mm), whichever is greater.

Exception: Materials stored in tanks.

6604.1.5 Location in building. Unstable (reactive) materials shall not be stored in basements.

6604.2 Outdoor storage. Outdoor storage of unstable (reactive) materials in amounts exceeding the maximum allowable quantities per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

6604.2.1 Distance from storage to exposures Class 4 and 3 (detonable) materials. Outdoor storage of Class 4 or 3 (detonable) unstable (reactive) material shall be in accordance with Table 5604.5.2(2). The number of pounds of material listed in the table shall be the net weight of the material present. Alternatively, the number of pounds of material shall be based on a trinitrotoluene (TNT) equivalent weight.

6604.2.2 Distance from storage to exposures Class 3 (deflagratable) materials. Outdoor storage of deflagratable Class 3 unstable (reactive) materials shall be in accordance with Table 5604.5.2(3). The number of pounds of material listed shall be the net weight of the material present.

6604.2.3 Distance from storage to exposures Class 2 and 1 materials. Outdoor storage of Class 2 or 1 unstable (reactive) materials shall not be located within 20 feet (6096 mm) of buildings not associated with the manufacture or distribution of such materials, lot lines, public streets, public alleys, public ways or means of egress. The minimum required distance shall not apply where fire barriers without openings or penetrations having a minimum fire-resistance rating of 2 hours interrupt the line of sight between the storage and the exposure. The fire barrier shall either be an independent structure or the exterior wall of the building adjacent to the storage area.

6604.2.4 Storage configuration. Piles of unstable (reactive) materials shall not exceed 1,000 cubic feet (28 m^3).

6604.2.5 Aisle widths. Aisle widths between piles shall be not less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

SECTION 6605—USE

6605.1 General. The use of unstable (reactive) materials in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 67 – WATER-REACTIVE SOLIDS AND LIQUIDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

The state agency does not adopt sections identified by the following symbol: †

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.

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CHAPTER

67

WATER-REACTIVE SOLIDS AND LIQUIDS

User notes:

About this chapter: Chapter 67 addresses the hazards associated with water-reactive materials that are solid or liquid at normal temperatures and pressures. In addition to their water reactivity, these materials may pose a wide range of other hazards, such as toxicity, flammability, corrosiveness or oxidizing potential. This chapter addresses only those materials whose primary hazard is water reactivity. Materials that pose multiple hazards must conform to the requirements of this code with respect to all hazards. Strict compliance with the requirements of this chapter, along with proper housekeeping and storage arrangements, helps to reduce the exposure to hazards associated with water-reactive materials in a fire or other emergency.

SECTION 6701—GENERAL

6701.1 Scope. The storage and use of water-reactive solids and liquids shall be in accordance with this chapter.

Exceptions:

1. Display and storage in Group M and storage in Group S occupancies complying with Section 5003.11.
2. Detonable water-reactive solids and liquids shall be stored in accordance with Chapter 56.

6701.2 Permits. Permits shall be required as set forth in Section 105.5.

SECTION 6702—DEFINITION

6702.1 Definition. The following term is defined in Chapter 2:

WATER-REACTIVE MATERIAL.

Class 3.

Class 2.

Class 1.

SECTION 6703—GENERAL REQUIREMENTS

6703.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of water-reactive solids and liquids in amounts not exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Sections 5001, 5003, 6701 and 6703.

6703.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of water-reactive solids and liquids in amounts exceeding the maximum allowable quantity per control area indicated in Section 5003.1 shall be in accordance with Chapter 50 and this chapter.

SECTION 6704—STORAGE

6704.1 Indoor storage. Indoor storage of water-reactive solids and liquids in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1), shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

6704.1.1 Detached storage. Storage of water-reactive solids and liquids shall be in detached buildings where required by Section 5003.8.2.

6704.1.2 Liquid-tight floor. In addition to the provisions of Section 5004.12, floors in storage areas for water-reactive solids and liquids shall be of liquid-tight construction.

6704.1.3 Waterproof room. Rooms or areas used for the storage of water-reactive solids and liquids shall be constructed in a manner that resists the penetration of water through the use of waterproof materials. Piping carrying water for other than approved automatic sprinkler systems shall not be within such rooms or areas.

6704.1.4 Watertight containers. Where Class 3 water-reactive solids and liquids are stored in areas equipped with an automatic sprinkler system, the materials shall be stored in closed watertight containers.

6704.1.5 Storage configuration. Water-reactive solids and liquids stored in quantities greater than 500 cubic feet (14 m^3) shall be separated into piles, each not larger than 500 cubic feet (14 m^3). Aisle widths between piles shall be not less than the height of the pile or 4 feet (1219 mm), whichever is greater.

Exception: Water-reactive solids and liquids stored in tanks.

Class 2 water-reactive solids and liquids shall not be stored in basements unless such materials are stored in closed watertight containers or tanks.

Class 3 water-reactive solids and liquids shall not be stored in basements.

Class 2 or 3 water-reactive solids and liquids shall not be stored with flammable liquids.

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6704.1.6 Explosion control. Indoor storage rooms, areas and buildings containing Class 2 or 3 water-reactive solids and liquids shall be provided with explosion control in accordance with Section 911.

6704.2 Outdoor storage. Outdoor storage of water-reactive solids and liquids in quantities exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5004 and this chapter.

6704.2.1 General. Outdoor storage of water-reactive solids and liquids shall be within tanks or closed water-tight containers and shall be in accordance with Sections 6704.2.2 through 6704.2.5.

6704.2.2 Class 3 distance to exposures. Outdoor storage of Class 3 water-reactive solids and liquids shall not be within 75 feet (22 860 mm) of buildings, lot lines, public streets, public alleys, public ways or means of egress.

6704.2.3 Class 2 distance to exposures. Outdoor storage of Class 2 water-reactive solids and liquids shall not be within 20 feet (6096 mm) of buildings, lot lines, public streets, public alleys, public ways or means of egress. A 2-hour fire barrier without openings or penetrations, and extending not less than 30 inches (762 mm) above and to the sides of the storage area, is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

6704.2.4 Storage conditions. Class 3 water-reactive solids and liquids shall be limited to piles not greater than 500 cubic feet (14 m^3).

Class 2 water-reactive solids and liquids shall be limited to piles not greater than 1,000 cubic feet (28 m^3).

Aisle widths between piles shall be not less than one-half the height of the pile or 10 feet (3048 mm), whichever is greater.

6704.2.5 Containment. Secondary containment shall be provided in accordance with the provisions of Section 5004.2.2.

SECTION 6705—USE

6705.1 General. The use of water-reactive solids and liquids in amounts exceeding the maximum allowable quantity per control area indicated in Table 5003.1.1(1) or 5003.1.1(3) shall be in accordance with Sections 5001, 5003, 5005 and this chapter.

CHAPTERS

68–79 RESERVED

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
CHAPTER 80 – REFERENCED STANDARDS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
ANSI/APA PRG 320—18			X																				
ASME A17.1/CSA B44			X																				
ASME A17.3—2023			X																				
ASME BPE—2009			X																				
ASTM D3498—03(2011)			X																				
ASTM E108—*2020a*			X																				
ASTM F2374—*21a*			X																				
CA CA-116			X																				
CA CA-117			X																				
FM3260—00			X																				
FM3011—99			X																				
ICC ES AC 331			X																				
NFPA 2—*20*			X																				
NFPA 10—*21*			X																				
NFPA 11—*24*			X																				
NFPA 13—*25*			X																				
NFPA 13D—*25*			X																				
NFPA 13R—*25*			X																				
NFPA 14—*24*			X																				
NFPA 17—*24*			X																				
NFPA 17A—*24*			X																				
NFPA 20—*25*			X																				
NFPA 24—*25*			X																				
NFPA 25—13 CA			X																				
NFPA 31—*24*			X																				
NFPA 32—21			X																				
NFPA 33—*24*			X																				
NFPA 34—*24*			X																				
NFPA 37—18			X																				
NFPA 40—*25*			X																				
NFPA 45—*24*			X																				
NFPA 52—*23*			X																				
NFPA 54—18			X																				
NFPA 58—*24*			X																				
NFPA 59A—*24*			X																				

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CHAPTER 80 – REFERENCED STANDARDS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
NFPA 69—*24*			X																				
NFPA 72—*25*			X																				
NFPA 76—*24*			X																				
NFPA 80—*25*			X																				
NFPA 92—*24*			X																				
NFPA 105—*25*			X																				
NFPA 110—*25*			X																				
NFPA 111—*25*			X																				
NFPA 120—*23*			X																				
NFPA 170—*24*			X																				
NFPA 204—*24*			X																				
NFPA 260—*24*			X																				
NFPA 286—*24*			X																				
NFPA 318—*25*			X																				
NFPA 326—*25*			X																				
NFPA 400—*25*			X																				
NFPA 410—*25*			X																				
NFPA 502—14			X																				
NFPA 505—*24*			X																				
NFPA 855—*23*			X																				
NFPA 914—*24*			X																				
NFPA 1122—*22*			X																				
NFPA 2001—22			X																				
NFPA 2010—*23*			X																				
SFM 12-3			X																				
SFM 12-7-3			X																				
SFM 12-7A-1			X																				
SFM 12-7A-2			X																				
SFM 12-7A-3			X																				
SFM 12-7A-4			X																				
SFM 12-7A-4A			X																				
SFM 12-7A-5			X																				
SFM 12-8-100			X																				
SFM 12-10-1			X																				
SFM 12-10-2			X																				
SFM 12-10-3			X																				

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CHAPTER 80 – REFERENCED STANDARDS—continued

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
UL 13—96			X																				
UL 38—99			X																				
UL 193—04			X																				
UL 199—95			X																				
UL 228—97			X																				
UL 260—04			X																				
UL 262—04			X																				
UL 268A—09			X																				
UL 312—04			X																				
UL 346—05			X																				
UL 464—03			X																				
UL 497B—04			X																				
UL 521—99			X																				
UL 539—00			X																				
UL 632—00			X																				
UL 753—04			X																				
UL 790 *Edition 9—2022*			X																				
UL 793—08			X																				
UL 813—96			X																				
UL 864—14			X																				
UL 9540 *Edition 3—2023*			X																				
UL 9540A *Edition 4—2019*			X																				

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CHAPTER

80 REFERENCED STANDARDS

User notes:

About this chapter: This code contains numerous references to standards promulgated by other organizations that are used to provide requirements for materials and methods of construction. This chapter contains a comprehensive list of all standards that are referenced in this code. These standards, in essence, are part of this code to the extent of the reference to the standard.

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.7.

AASHTO

American Association of State Highway and Transportation Officials, 444 North Capitol Street, NW, Suite 249, Washington, DC 20001

HB-17—2002: Standard Specifications for Highway Bridges, 17th Edition
503.2.6

AFSI

Architectural Fabric Structures Institute, c/o Industrial Fabric Association International, Roseville, MN 55113

ASI-77: Design and Standards Manual
3103.9.2

ANSI

American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036

ANSI E1.21—2020: Entertainment Technology: Temporary Structures Used for Technical Production of Outdoor Entertainment Events
3105.1, 3105.3, 3105.4

APA

APA – The Engineered Wood Association, 7011 S. 19th Street, Tacoma, WA 98466-5333

ANSI/APA PRG 320—18: *Standard for Performance-rated Cross Laminated Timber*
701.6, 914.3.1.2, 3303.5

API

American Petroleum Institute. 1220 L Street, NW, Washington, DC 20005

Publ 2201—6th Edition (2023): Procedures for Welding or Hot Tapping on Equipment in Service
5706.7

RP 2009—8th Edition (2022): Safe Welding and Cutting Practices in Refineries, Gas Plants and Petrochemical Plants
5706.7

RP 2028 4th Edition—(2024): Flame Arrestors in Piping Systems
5704.2.7.3.2

RP 651—5th Edition (2022): Cathodic Protection of Aboveground Petroleum Storage Tanks
5706.7, 5706.7.1

RP 752— 4th Edition (2022): Management of Hazards Associated with Location of Process Plant Buildings, CMA Managers Guide
5706.7

RP 1604—4th Edition (2021): Closure of Underground Petroleum Storage Tanks
5704.2.13

RP 1615—(1996) 6th Edition (R2020): Installation of Underground-Petroleum Storage Systems
5704.2.13.1.5, 5706.7

RP 2001—10th Edition (2022): Fire Protection in Refineries
5706.7

RP 2003—9th Edition (2023): Protection Against Ignitions Arising out of Static, Lightning and Stray Currents
5706.7

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RP 2023—4th Edition (2023): Guide for Safe Storage and Handling of Heated Petroleum-Derived Asphalt Products and Crude-Oil Residue
5706.7, 5706.7.3

Std 653 Addendum 3—5th Edition (2022): Tank Inspection, Repair, Alteration and Reconstruction
5706.7

Std 2000—8th Edition (2023): Venting Atmosphere and Low-Pressure Storage Tanks: Nonrefrigerated and Refrigerated
5704.2.7.3.2

Std 2015—9th Edition (2023): Requirements for Safe Entry and Clearing of Petroleum Storage Tanks
5706.7, 5706.7.2

Std 2350—5th Edition (2021): Overfill Protection for Storage Tanks in Petroleum Facilities
5704.2.7.5.8, 5706.4.6, 5706.7

ASCE/SEI American Society of Civil Engineers, Structural Engineering Institute, Reston, VA 20191-4400

ASCE/SEI 24—14: Flood Resistant Design and Construction
1203.1.8

ASHRAE ASHRAE, 180 Technology Parkway, Peachtree Corners, GA 30092

15—2022: Safety Standard for Refrigeration Systems
608.1.1, 608.18.3

170—2021: Ventilation of Health Care Facilities
1020.6

ASME American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990

A13.1—2020: Scheme for the Identification of Piping Systems
3509.3, 5003.2.2.1, 5303.4.3, 5503.4.5, 5703.5.2

A17.1—2022/CSA B44—2022 *the edition as referenced in*: Safety Code for Elevators and Escalators, *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders*
508.1.6, 604.2, *606.2.5, 606.8.6, 606.8.6.1, 606.8.6.2, 606.8.6.3, 606.8.6.4,* 907.3.3, 1009.4.1, *1103.3.3*

A17.3—2023: Safety Code for Existing Elevators and Escalators *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders*
1103.3.1, 1103.3.2

B16.18—2023: Cast Copper Alloy Solder Joint Pressure Fittings
909.13.1

B16.22—2023: Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
909.13.1

B31.1—2022: Power Piping
5003.2.2, Table 5703.6.2

B31.3—2022: Process Piping
5003.2.2.2, Table 5703.6.2

B31.4—2022: Pipeline Transportation Systems for Liquids and Slurries
Table 5703.6.2

B31.9—2023: Building Services Piping
Table 5703.6.2, 5703.6.3, 5703.6.11

BPE—2009: Bioprocessing Equipment Standard

BPVC—2023: ASME Boiler & Pressure Vessel Code (Sections I, II, IV, V, VI and VIII)
5003.2.1, 5303.2, 5303.3.2, 5503.2.6, 5503.4.3, 5503.7, 5704.2.13.1.5, 5806.3.1, 5806.4.1, 5806.4.8

ASSP American Society of Safety Professionals, 520 N. Northwest Highway, Park Ridge, IL 60068

ANSI/ASSP Z359.1—2020: The Fall Protection Code
1015.6, 1015.7

ASTM ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959

B42—20: Specification for Seamless Copper Pipe, Standard Sizes
909.13.1

B43—20: Specification for Seamless Red Brass Pipe, Standard Sizes
909.13.1

B68/B68M—19: Standard Specification for Seamless Copper Tube, Bright Annealed (Metric)
909.13.1

B88—20: Standard Specification for Seamless Copper Water Tube
909.13.1

B251/B251M—2017: Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
909.13.1

B280—20: Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service
909.13.1

D56—21a: Test Method for Flash Point by Tag Closed Cup Tester
202

D86—20b: Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure
202

D92—2018: Test Method for Flash and Fire Points by Cleveland Open Cup Tester
202, 2401.2, 5001.1, 5104.1.1, 5104.1.2, 5701.2,

D93—20: Test Methods for Flash Point by Pensky-Martens Closed Up Tester
202

D323—20a: Test Method for Vapor Pressure of Petroleum Products (Reid Method)
202

D2859—2016(2021): Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
804.3.3.1, 804.3.3.2

D3278—21: Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
202

D3498—03(2011): Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems
701.6, 914.3.1.2, 3303.5

E84—21a: Standard Test Method for Surface Burning Characteristics of Building Materials
202, 803.1, 803.1.2, 803.3, 803.5.2, 803.10, 803.12, 803.13, 804.1.1, 804.1.2, 804.2.4, 3311.1

E108—*2020a*: Standard Test Methods for Fire Tests of Roof Coverings
1207.9.5

E648—19ae1: Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
804.3.1, 804.3.2, 804.4

E681—09(2015): Standard Test Method for Concentration Limits of Flammability of Chemicals (Vapors and Gases)
202

E1354—22: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
304.3.2, 304.3.4, 318.1, 2310.5.3, 3304.1.3, 3311.1, 3603.4

E1529—16e1: Standard Test Method for Determining Effects of Large Hydrocarbon Pool Fires on Structural Members and Assemblies
5704.2.9.2.3

E1537—22: Test Method for Fire Testing of Upholstered Furniture
805.1.1.2, 805.2.1.2, 805.3.1.2, 805.4.1.2

E1590—2022: Test Method for Fire Testing of Mattresses
805.1.2.2, 805.2.2.2, 805.3.2.2.1, 805.4.2.2

E1966—15(2019): Standard Test Method for Fire-Resistant Joint Systems
202

E2072—14: Standard Specification for Photoluminescent (Phosphorescent) Safety Markings
1025.4

E2404—17: Standard Practice for Specimen Preparation and Mounting of Textile, Paper or Polymeric (Including Vinyl) and Wood Wall or Ceiling Coverings, Facing and Veneers to Assess Surface Burning Characteristics
803.5.1, 803.5.2, 803.12

E2573—19: Standard Practice for Specimen Preparation and Mounting of Site-Fabricated Stretch Systems to Assess Surface Burning Characteristics
803.10

E2579—21: Standard Practice for Specimen Preparation and Mounting of Wood Products to Assess Surface Burning Characteristics
803.13

E3082—20: Standard Test Methods for Determining the Effectiveness of Fire-Retardant Treatments for Natural Christmas Trees
806.1.4

F1085—19: Standard Specification for Mattress and Box Springs for Use in Berths in Marine Vessels
805.3.2.2.2

F2006—21: Standard/Safety Specification for Window Fall Prevention Devices for Non-Emergency Escape (Egress) and Rescue (Ingress) Windows
1015.8

F2090—21: Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms
1015.8, 1031.2.1

F2200—20: Standard Specification for Automated Vehicular Gate Construction
503.5, 503.6

F2374—*21a*: Standard Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices
3106.2

BHMA

Builders Hardware Manufacturers' Association, 355 Lexington Avenue, 15th Floor, New York, NY 10017

A156.10—2022: Power-Operated Pedestrian Doors
1010.3.2

A156.19—2019: Power Assist and Low-Energy Power-Operated Doors
1010.3.2

A156.27—2019: Power- and Manual-Operated Revolving Pedestrian Doors
1010.3.1, 1010.3.1.1

A156.38—2019: Low-Energy Power-Operated Sliding and Folding Doors
1010.3.2

CA

State of California Department of Consumer Affairs, Bureau of Household Goods and Services, 4244 South Market Court, Suite D, Sacramento, CA 95834-1243

California Technical Bulletin 129—1992: Flammability Test Procedure for Mattresses for Use in Public Buildings
805.2.2.2, 805.3.2.2.1, 805.4.2.2

California Technical Bulletin *116: Requirements, Test Procedure and Apparatus for Testing of the Flame Retardance of Upholstered Furniture*
805.2.1.2, 805.4.1.2

California Technical Bulletin 117: Requirements, Test Procedure and Apparatus for Testing the Smolder Resistance of Materials Used in Upholstered Furniture
805.2.1.2, 805.4.1.2

CGA

Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151

ANSI/CGA G-13—(2015): Storage and Handling of Silane and Silane Mixtures
6404.1, 6404.2, 6405.3

ANSI/CGA P-18—(2018): Standard for Bulk Inert Gas Systems
5501.1

C-7—(2020): Guide to Classification and Labeling of Compressed Gases
5303.4.2, 5503.4.2

P-1—(2015): Standard for Safe Handling of Compressed Gases in Containers
5305.7

S-1.1—(2019): Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases
5303.3.2, 5503.2

S-1.2—(2019): Pressure Relief Device Standards—Part 2—Portable Containers for Compressed Gases
5303.3.2, 5503.2

S-1.3—(2020): Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases
5303.3.2, 5503.2

V-1—(2021): Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections
3505.2.1

CGR Coast Guard Regulations, c/o Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325

46 CFR Parts 30, 32, 35 & 39—1999: Shipping
5706.8

CPSC Consumer Product Safety Commission, 4330 East-West Highway, Bethesda, MD 20814

16 CFR Part 1500 (2009): Hazardous Substances and Articles; Administration and Enforcement Regulations
202, 5601.1.3

16 CFR Part 1500.41 (2009): Method for Testing Primary Irritant Substances
202

16 CFR Part 1500.42 (2009): Test for Eye Irritants
202

16 CFR Part 1500.44 (2009): Method for Testing Extremely Flammable and Flammable Solids
202

16 CFR Part 1507 (2002): Fireworks Devices
202, 5601.1.3

16 CFR Part 1630 (2007): Standard for the Surface Flammability of Carpets and Rugs
804.3.3.1, 804.3.3.2

CSA CSA Group, 8501 East Pleasant Valley Road, Cleveland, OH 44131

ANSI Z21.69—2015 (R2020)/CSA 6.16—(R2020): Connectors for Moveable Gas Appliances
606.4

ANSI Z83.26—2014/CSA 2.37—14: Gas-Fired Outdoor Infrared Patio Heaters
4103.1.2.2.1

CSA/ANSI FC1—21/CSA C22.2 No 62282-2-100—21: Fuel Cell Technologies—Part 3-100: Stationary Fuel Cell Power Systems—Safety
1206.3

CSA/ANSI NGV 5.1—22: Residential Fueling Appliances
2308.2.3

CSA/ANSI NGV 5.2—2022: Vehicle Fueling Appliances (VFA)
2308.2.4

DOC U.S. Department of Commerce, 1401 Constitution Avenue, NW, Washington, DC 20230

16 CFR Part 1632—2015: Standard for the Flammability of Mattress and Mattress Pads (FF 4-72, Amended)
805.1.2.1, 805.2.2.1, 805.3.2.1, 805.4.2.1

DOL U.S. Department of Labor, c/o Superintendent of Documents, Washington, DC 20402-9325

29 CFR Part 1910.1000—2015: Air Contaminants
202, 2104.2.1

29 CFR Part 1910.1200 (2015): Hazard Communication
202, 5603.6

DOTn U.S. Department of Transportation, Office of Hazardous Material Safety, 1200 New Jersey Avenue SE, East Building 2nd Floor, Washington, DC 20590

33 CFR Part 154—2015: Facilities Transferring Oil or Hazardous Material in Bulk
5706.8

33 CFR Part 155—2015: Oil or Hazardous Material Pollution Prevention Regulations for Vessels
5706.8

33 CFR Part 156—2015: Oil and Hazardous Material Transfer Operations
5706.8

49 CFR Part 172—2015: Hazardous Materials Tables, Special Provisions, Hazardous Materials Communications, Emergency Response Information and Training Requirements
5604.6.5.2

49 CFR Part 173—2009: Shippers—General Requirements for Shipments and Packagings
5104.1.1, 5104.1.2, 5606.3

49 CFR Part 173.137—2009: Shippers—General Requirements for Shipments and Packagings: Class 8—Assignment of Packing Group
202

49 CFR Part 173.192—2006: Packaging for Certain Toxic Gases in Hazard Zone A
Table 5003.8.2

49 CFR Part 178—2015: Specifications for Packagings
3505.4

49 CFR Parts 100–185—2015: Hazardous Materials Regulations
202, 3505.4, 5303.2, 5503.4.3, 5503.7, 5601.1, 5601.1.3, 5601.3, 5706.5.1.15

DOTy U.S. Department of Treasury, c/o Superintendent of Documents, Washington, DC 20402-9325

27 CFR Part 555—2015: Commerce in Explosives, as amended through April 1, 1998
202, 5604.6.5.2

EN European Committee for Standardization (EN), Rue de la Science 23, Brussels, Belgium B-10 50

EN 1081—1998: Resilient Floor Coverings—Determination of the Electrical Resistance
2309.5.1.1

FCC Federal Communications Commission, Wireless Telecommunications Bureau (WTB), Washington, DC 20554

47 CFR Part 90.219—2014: Private Land Mobile Radio Services—Use of Signal Boosters
510.5.5

FM FM Approvals, Headquarters Office 1151 Boston-Providence Turnpike P.O. Box 9102, Norwood, MA 02062

3260—00: Radiant Energy-Sensing Fire Detectors for Automatic Fire Alarm Signaling

3011—99: Approval Standard for Central Station Service for Fire Alarm and Protective Equipment Supervision
907.6.6.4

4430—2012: Approval Standard for Heat and Smoke Vents
910.3.1

ANSI/FM 4996—2019: Approval Standard for Classification of Pallets and Other Material Handling Products as Equivalent to Wood Pallets
315.7.5, 3206.4.1.1

ICC International Code Council, Inc., 200 Massachusetts Avenue, NW, Suite 250, Washington, DC 20001

CBC—25: California Building Code
201.3, 202, 203.1, 203.1.1, 203.2.5, 203.3.1, 203.3.2, 203.3.3, 203.4.1, 203.4.3, 203.5.1.1, 203.6, 203.6.1, 203.6.2, 203.6.4, 203.6.5, 203.6.7, 203.7.1, 203.7.2.1, 203.7.3, 203.8.2, 203.9, 203.9.3.2, 203.9.4, 203.10.2, 203.10.3, 203.10.3.1, 203.10.3.2, 203.10.4.1, 203.11, 203.11.2, 203.11.3, 304.1.4, 304.3.6, 304.3.7, 306.1, 311.1.1, 311.3, 313.1, 317.1, 320.4.2.2, 320.4.3.1, 320.4.3.2, *322.4.2.2, 322.4.3.1,* 403.7.3.4, 403.10.4, 404.2.1, *404.6.3, 404.6.4, 404.6.5, 404.6.5.3,* 504.1, 508.1, 508.1.2, 510.5.1, 603.1, 604.1, 604.4, 604.5, 604.5.1, 604.5.2, 604.5.3, 604.5.4, *604.6.4.2, 604.6.4.4,* 605.2.1.1, 605.3, 605.4.2.6, 605.5.2, 605.7, 701.1, 701.6, 801.1, 803.1, Table 803.3, 803.11.1, 803.11.2, 803.15, 807.2, 807.5.1.2, 808.4, 901.4, 901.4.1, 901.4.2, 901.4.3, 901.4.4, *Table 902.2.11.6,* 903.2, *903.2.6, 903.2.8,* 903.2.9.1, 903.2.10, *9 03.2.21,* 903.3.1.1.1, 903.3.1.2, 903.3.1.2.1, 903.3.1.2.3, 903.3.2, *905.3.9, 905.4,* 904.15, 907.1.1, 907.2.1, *907.2.3.1,* 907.2.6.2, *907.2.6.2.2*, 907.2.6.3.3, 907.2.6.3.3, 907.2.7.1, 907.2.13, 907.2.18, 907.2.21, *907.2.25.2, 907.4.2.2,* 907.5.2.1, *Table 907.5.2.3.2,* 907.6.6, 909.1, 909.2, 909.3, 909.4.3, 909.5, 909.5.3, 909.5.3.1, 909.5.3.2, 909.6.3, 909.10.5, 909.11.1, 909.18.8, 909.20.2, 909.20.2.1, 909.20.3.1, 909.20.3.2, 909.20.5.1, 909.21.1, 910.4.5, Table 911.1, 911.2, 913.2.1, 914.1, 914.2.1, 914.3.1, 914.3.2, *914.3.8, 914.3.8.2,* 914.4.1, 914.5.3, *914.7,* Table 914.8.3, 914.8.3.2, 914.10, *1003.1*, 1003.2, *1003.3.4*, 1003.5, Table 1004.5, 1004.6, 1005.7.2, 1006.2.1, Table 1006.2.1, *Table 1006.3.4(2),* 1008.3.1, *1009.1*, 1009.2, 1009.4.1, 1009.4.2, 1009.5, 1009.6.4, 1009.7.2, *1010.1.2.1,* 1010.1.4, 1010.1.6, 1010.2.2, *1010.2.5*, 1010.2.6, *1010.2.9*, 1010.3.1, 1010.3.3, *1011.5.2,* 1011.7, 1011.10, 1011.11, 1011.12.2, 1012.6.3, 1012.6.4, *1013.4, 1013.7,* 1014.1, 1015.2, 1015.2.1, 1016.2, Table 1017.2, 1018.3, 1018.5, 1019.3, 1019.4, 1020.2, Table 1020.2, 1020.2.1, *Table 1020.3,* 1021.4, *1022.3*, 1023.2, 1023.3.1, 1023.4, 1023.5, 1023.6, 1023.7, *1023.9*, 1023.12, 1023.12.1, 1023.12.2, 1024.3, 1024.5, 1024.6, 1024.7, 1024.8, 1026.2, 1026.3, 1026.4.1, 1027.5, 1028.2, 1030.1.1.1, 1030.14.1, 1030.16.4, *1031.2.1,* 1031.5.3, 1101.2, 1101.3, 1103.3.2, *1103.3.3*, 1103.4.1, 1103.4.8, 1103.4.9.1, 1103.4.9.2.1, 1103.4.9.2.2, 1103.4.9.4, 1103.4.9.5, 1103.4.10, 1103.5.4,

1104.5, 1104.17, 1104.17.1, 1104.18, Table 1104.18, 1105.4.1, 1105.4.3.1, 1105.4.3.2, 1105.5.7, 1105.7.2, 1105.7.3, 1105.7.4, 1105.7.5, 1105.7.6, 1105.8, *1113.6.1, 1113.6.1.4.2, 1113.7, 1113.10, 1113.12.1, 1113.13.2, 1113.13.3, 1114.8, 1114.13, 1114.15, 1114.16, 1114.17, 1114.20, 1114.22, 1114.25, 1114.26, 1115.3, 1115.4, 1115.6, 1115.7, 1115.8,* 1203.1, 1203.1.3, 1203.1.8, 1203.2.1, 1203.2.8, 1203.2.9, 1203.2.11, 1203.2.16, 1203.2.19, 1205.1, 1206.6.2, 1207.4.4, 1207.7.4, 1207.9.2, 1207.11.3, 2004.6, 2006.17, 2007.1, 2007.4, 2103.3, 2107.1, 2301.1, 2301.4, 2303.1, 2307.4, 2308.3, 2308.3.1, 2309.3.1.5.1, 2309.3.2, 2310.1, 2311.1, 2311.3.1, 2311.4.1, 2311.8.3, 2404.4, 2404.5.1, 2404.5.3.6, 2404.5.5, 2405.2, 2701.1, 2701.4, 2703.2.2, 2703.3.1, 2703.3.2, 2703.3.4, 2703.3.8, 2703.14, 2703.14.1, 2703.14.2, 2703.15.1, 2704.3.1, 2705.2.3.2, 2705.3.1, 2705.3.2.1, 2705.3.3, 2803.1, 2905.1, 2909.2, 2909.4, 2909.6, 3101.1, 3103.1, 3103.3.1, 3103.7.2, 3103.7.4, 3103.8.2, 3103.8.3, 3103.8.4, 3104.1, 3105.4, 3201.3, 3206.3.2, 3206.9, 3207.2, 3208.1.1, 3208.2, 3306.5, 3403.1, 3704.3, 3704.4, 3704.5, 3801.1, 3801.2, 3804.1, 3804.1.1.1, Table 3805.4, Table 3806.2.1, 3901.1, 3903.1, 3904.1, *4802.1, 4802.2, 4804.5, 4804.6, 4902, 4905.2, Table 5003.1.1(1), Table 5003.1.1(2),* 5003.2.2.2, 5003.2.8, 5003.8.1, Table 5003.8.2, 5003.8.3, 5003.8.3.1, 5003.8.4.1, 5003.9.9, *5003.10.5.1,* 5004.13, 5005.2, 5005.3.9, 5101.1, 5303.16.1, 5303.16.2, 5306.1, 5306.2, 5306.2.1, 5306.2.2, 5307.4.6, 5503.1.2, 5503.5.2, 5504.2.1.2, 5504.2.2.2, 5505.4.1, 5604.2, Table 5604.5.2(3), 5605.5, 5701.3, 5704.2.7.7, 5704.2.8.1, 5704.2.8.2, 5704.2.9.3, 5704.2.9.4, 5704.3.3.5, 5704.3.7.1, 5704.3.8, 5705.3.4, 5705.3.5.3, 5705.3.7.1, 5705.3.7.2, 5705.3.7.3, 5705.3.7.4, 5705.3.7.5.1, 5706.2.3, 5706.4.1, 5803.1.1, 5806.4.3, 5808.1, 5808.3, 5808.3.2, 5906.2.2, 5906.2.3, 5906.4.2, 6003.1.4.2, 6005.3.1, 6109.11.2, 6204.1.2, 6306.4, 6404.1.4, 6604.1

CEBC—25: California Existing Building Code

102.3, 1011.5.2, 1103.1, 1104.18, 1105.5.2

CMC—25: California Mechanical Code

201.3, 308.3, 605.1, 605.2.1.1, 605.2.1.2, 605.2.1.3, 605.2.1.4, 605.2.1.5, 605.3, 605.4, 605.4.2.3, 605.4.2.5, 605.5.2, 605.7, 606.1, 606.2, 608.1, 608.3, 608.4, 608.5, 608.8, 608.9.1, 608.10, 608.17, 610.1.1, 903.2.11.4, 904.14, 907.3.1, 909.1, 909.10.2, 909.13.1, 910.4.7, 915.6.1, 1006.2.2.3, 1011.16, 1020.6.1, 1207.4.7, 1207.6.1, 1207.6.1.2.2, 1207.11.8, 2104.2.1, 2105.3, 2301.1, 2301.6, 2309.3.1.2, 2311.3.1, 2311.4.3, 2311.8.2, 2311.8.8, 2311.8.10, 2404.9, 2404.9.2, 2504.5, 2703.2.2, 2703.10.4, 2703.14, 2803.2, 2803.3, 3001.1, 3003.1, 3004.2, 3108.12.1, 3108.12.2, 3703.5, 3804.1.1.7, 3904.1, 3905.3, Table 5003.1.1(1), 5003.8.4.2, 5003.8.5.2, 5003.8.6.2, 5004.3.1, 5303.7.6, 5303.16.9, 5305.5, 5306.2.2, 5306.2.3, 5307.4.4, 5504.2.1.3, 5504.2.2.3, 5505.4.1.1, 5701.3, 5703.6.1, 5704.2.8.9, 5705.3.7.5.1, 5706.2, 5706.4.4, 6003.1.3, 6003.2.3.2, 6004.2.2.7, 6005.3.1, 6005.3.2, 6103.2.1.7

CPC—25: California Plumbing Code

201.3, 903.3.5, 904.11.1.3, 912.6, 2311.2.3, 5004.2.2.6

CRC—25: California Residential Code

102.5, 202, 913.1, 1001.1, 1205.1, 1205.2.1

ICC 300—2017: Standard on Bleachers, Folding and Telescopic Seating and Grandstands

1030.1.1, 1030.17

ICC ES AC 331: Acceptance Criteria for Smoke and Heat Vents

910.3.1

ICC 500—2020: ICC/NSSA Standard on the Design and Construction of Storm Shelters

1031.2

ICC A117.1—2017: Accessible and Usable Buildings and Facilities

907.5.2.3.3, 1009.2.2, 1009.8.2, 1009.9, 1009.11, 1010.2.12.1, 1012.1, 1012.6.5, 1012.10, 1013.4, 1023.11

IFGC—24: International Fuel Gas Code®

201.3, 605.1, 605.2.1.3, 605.3, 605.5.2, 605.7, 610.1.1, 1206.9, 2301.1, 2301.6, 2308.1, 2309.3.1.2, 2309.3.1.5, 2504.5, 3001.1, 3003.1, 3004.1, 3004.2, 3108.12.1, 3108.12.2, 3305.1.2, 3309.2.2, 4101.6.1, Table 5003.1.1(1), 5301.1, 5801.1, 5803.1.4, 6103.1, 6103.2.1.7, 6103.3

IIAR International Institute of Ammonia Refrigeration, 1001 N. Fairfax Street, Suite 503, Alexandria, VA 22314

ANSI/IIAR 2—2021: Safe Design of Closed-Circuit Ammonia Refrigeration Systems

608.1.2, 608.9

ANSI/IIAR 6—2019: Standard for Inspection, Testing, and Maintenance of Closed-Circuit Ammonia Refrigeration Systems

608.1.2

ANSI/IIAR 7—2019: Developing Operating Procedures for Closed-Circuit Ammonia Refrigeration Systems

608.1.2

ANSI/IIAR 8—2020: Decommissioning of Closed-Circuit Ammonia Refrigeration Systems

608.1.2

ANSI/IIAR 9 —2020: Minimum System Safety Requirements for Existing Closed-Circuit Ammonia Refrigeration Systems

608.1.2

IKECA International Kitchen Exhaust Cleaning Association, 100 North 20th Street, Suite 400, Philadelphia, PA 19103

ANSI/IKECA C10—2021: Standard for the Methodology for Cleaning Commercial Kitchen Exhaust Systems

606.3.3.2

ISO International Organization for Standardization (ISO), ISO Central Secretariat 1 ch, de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland

ISO 8115—86: Cotton Bales—Dimensions and Density
Table 2704.2.2.1, Table 5003.1.1(1)

NEMA National Electrical Manufacturer's Association, 1300 North 17th Street Suite 900, Arlington, VA 22209

250—2020: Enclosures for Electrical Equipment (1,000 Volt Maximum)
6005.2

NFPA National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471

2—*20*: Hydrogen Technologies Code
1206.3, 1206.4, 2309.1, 2309.3.1.1, 2309.3.1.2, 2309.4, 2309.6, 2311.8, 2311.8.2, 2311.8.10, 2311.8.11, 5301.1, 5801.1

4—24: Standard for Integrated Fire Protection and Life Safety System Testing
901.6.2.1, 901.6.2.2

10—*21*: Standard for Portable Fire Extinguishers
Table 901.6.1, 906.2, Table 906.3(1), Table 906.3(2), 906.3.2, 906.3.4, 3006.3

11—*24*: Standard for Low-, Medium-, and High-Expansion Foam
904.7, 904.14, 5704.2.9.2.2

12—22: Standard on Carbon Dioxide Extinguishing Systems
Table 901.6.1, 904.8, 904.14, 1207.5.5

12A—22: Standard on Halon 1301 Fire Extinguishing Systems
Table 901.6.1, 904.9

13—*25*: Standard for the Installation of Sprinkler Systems *as amended
903.2.6.2, 903.2.15, 903.2.16, 903.3.1.1, 903.3.2, 903.3.8.2, 903.3.8.5, 904.14, 905.3.4, 907.6.4, 914.3.2, 1019.3, 1019.3, *1031.2.1*, 1103.4.8, *1114.27*, 3201.1, 3204.2, 3205.5, Table 3206.2, 3206.4.1, 3206.10, 3207.2, 3207.2.1, 3208.2.2, 3208.2.2.1, 3208.4, 3210.1, 3401.1, 5104.1, 5104.1.1, 5106.5.7, 5704.3.3.9, Table 5704.3.6.3(7), 5704.3.7.5.1, 5704.3.8.4

**NFPA 13, Amended Sections as follows:*

Revise Section 2.2 and add publications as follows:
2.2 NFPA Publications.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2013 California edition.*

Revise Section 6.4.3.1.1 as follows:

6.4.3.1.1* Pipe joints shall not be located under foundation footings. *The pipe under the building or building foundation shall not contain mechanical joints.*

Exceptions:

1. Where allowed in accordance with Section 6.4.3.1.

2. Alternate designs may be utilized where designed by a registered professional engineer and approved by the enforcing agency.

Revise Section 9.2.1.16 as follows:

9.2.1.16 *Exterior columns under 10 ft^2 (0.93m^2) in total area, formed by studs or wood joist, with no sources of ignition within the column, supporting exterior canopies that are fully protected with a sprinkler system, shall not require sprinkler protection.*

Revise Section 9.2.3.1* as follows:

9.2.3.1* *Sprinklers shall be permitted to be omitted where the exterior canopies, roofs, portecocheres, balconies, decks or similar projections are constructed with materials that are noncombustible, limited-combustible or fire retardant treated wood as defined in NFPA 703, Standard for Fire Retardant–Treated Wood and Fire-Retardant Coatings for Building Materials.*

Delete Section A.9.2.3.1 of Annex

Revise Section 9.2.3.2

9.2.3.2 *Sprinklers shall be permitted to be omitted from below the canopies, roofs, balconies, decks or similar projections are combustible construction, provided the exposed finish material on the roof or canopy is noncombustible, limited-combustible or fire retardant treated wood as defined in NFPA 703, Standard for Fire Retardant–Treated Wood and Fire-Retardant Coatings for Building Materials, and the roofs or canopies contains only sprinklered concealed spaces or any of the following unsprinklered combustible concealed spaces:*

(1) Combustible concealed spaces filled entirely with noncombustible insulation.

(2) Light or ordinary hazard occupancies where noncombustible or limited-combustible ceilings are directly attached to the bottom of solid wood joists so as to create enclosed joist spaces 160 ft^3 (4.5 m^3) or less in volume, including space below insulation that is laid directly on top or within the ceiling joists in an otherwise sprinklered attic [See 11.2.3.1.5.2(9)].

(3) Concealed spaces over isolated small roofs or canopies not exceeding 55 ft^2 (5.1 m^2).

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Delete language to section 9.2.3.3 and reserve section number.
9.2.3.3 Reserved.

Revise Section 9.3.19.1* as follows:

9.3.19.1 *Unless the requirements of 9.2.3.1 or 9.2.3.2 are met, sprinklers shall be installed under exterior roofs, canopies, porte-cochere, balconies, decks or similar projections exceeding 4 ft (1.2 m) in width.*

Revise Annex Section A9.3.19.2 as follows:

A9.3.19.2 *The presence of planters, newspaper machines and similar items, should not be considered storage.*

Add Section 9.3.19.3 as follows:

9.3.19.3 *Sprinklers may be omitted for following structures:*

(1) Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath including storage.

(2) Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.

Add new Sections 16.9.3.1.3.4 and 16.9.3.1.3.5 as follows:

16.9.3.1.3.4 *Where a system includes floor control valves, a hydraulic design information sign containing information for the floor shall be provided at each floor control valve. A hydraulic design information sign shall be provided for each area calculated. The installing contractor shall identify a hydraulically designed sprinkler system with a permanently marked weatherproof metal or rigid plastic sign secured with corrosion resistant wire, chain or other approved means. Such signs shall be placed at the alarm valve, dry pipe valve, preaction valve or deluge valve supplying the corresponding hydraulically designed area.*

16.9.3.1.3.5 *Control valves, check valves, drain valves, antifreeze valves shall be readily accessible for inspection, testing and maintenance. Valves located more than 7 feet above the finished floor shall be provided with a means of opening and closing the valve from the floor level.*

Add new Sections 16.9.10.5, 16.9.10.5.1, 16.9.10.5.1.1, 16.9.10.5.1.2, 16.9.10.5.1.3, 16.9.10.5.1.4, 16.9.10.5.2 as follows:

16.9.10.5 Sectional Valves.

16.9.10.5.1 *Private fire service main systems shall have sectional control valves at appropriate points in order to permit sectionalizing the system in the event of a break or for the making of repairs or extensions.*

16.9.10.5.1.1 *Sectional control valves are not required when the fire service main system serves less than six fire appurtenances.*

16.9.10.5.1.2 *Sectional control valves shall be indicating valves in accordance with Section 16.9.3.2.*

16.9.10.5.1.3 *Sectional control valves shall be located so that no more than five fire appurtenances are affected by shut-down of any single portion of the fire service main. Each fire hydrant, fire sprinkler system riser and standpipe riser shall be considered a separate fire appurtenance. In-rack sprinkler systems shall not be considered as a separate appurtenance.*

16.9.10.5.1.4 *The number of fire appurtenances between sectional control valves is allowed to be modified by the authority having jurisdiction.*

16.9.10.5.2 *A valve shall be provided on each bank where a main crosses a body of water or outside the building foundation(s) where the main or section of main runs under a building.*

Add new Section 17.2.2.9.1 as follows:

17.2.2.9.1 *Powder-driven studs used for attaching hangers to the building structure are prohibited in Seismic design Categories C, D, E and F.*

Revise Section 18.5.11.4 as follows:

18.5.11.4 *Where threaded pipe is used for sway bracing, it shall have a wall thickness of not less than Schedule 40.*

Replace Section 18.5.12.5 as follows:

18.5.12.5 *Lag screws or power-driven fasteners shall not be used to attach braces to the building structure.*

Replace Section 18.5.12.6 as follows:

18.5.12.6 *Fastening methods other than those identified in 9.3.5.12 shall not apply to other fastening methods, which shall be acceptable for use if certified by a registered professional engineer to support the loads determined in accordance with the criteria in 18.5.9. Calculations shall be submitted to the authority having jurisdiction.*

Revise Section 18.5.12.7.4 as follows:

18.5.12.7.4 *Concrete anchors when identified in 18.5.11.11 shall be acceptable for use where designed in accordance with the requirements of the building code and certified by a registered professional engineer.*

Revise Section 18.6.1(3) as follows:

18.6.1*(3) *No. 12, 440 lb (200 Kg) wire installed at least 45 degrees from the vertical plane and anchored on both sides of the pipe. Powder-driven fasteners for attaching restraint is allowed to be used provided that the restraint component does not support the dead load.*

Revise Section 19.2.3.1.5.2(9) as follows:

19.2.3.1.5.2(9) *Exterior columns under 10 ft^2 (0.93m^2) in total area, formed by studs or wood joist, with no sources of ignition within the column, supporting exterior canopies that are fully protected with a sprinkler system.*

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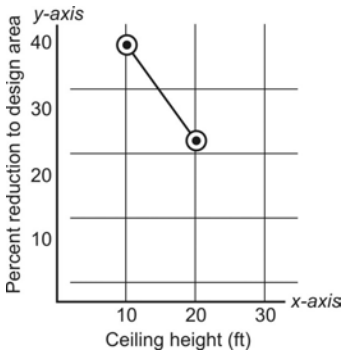
Revise Section 19.2.3.2.3.1 as follows:

19.2.3.2.3.1 *Where listed quick-response sprinklers, excluding extended coverage quick-response sprinklers, are used throughout a system or portion of a system having the same hydraulic design basis, the system area of operation shall be permitted to be reduced without revising the density as indicated in Figure 19.2.3.2.3.1 when all of the following conditions are satisfied:*

(1) Wet pipe system
(2) Light hazard occupancy
(3) 20 ft (6.1 m) maximum ceiling height
(4) There are no unprotected ceiling pockets as allowed by 10.2.9 and 11.2.7 exceeding 32 ft^2 (3 m^2)

FIGURE 19.2.3.2.3.1—DESIGN AREA REDUCTION FOR QUICK-RESPONSE SPRINKLERS



Note: $y = \frac{-3x}{2} + 55$
For ceiling height ≥ 10 ft and ≤ 20 ft, $y = \frac{-3x}{2} + 55$
For ceiling height < 10 ft, y = 40
For ceiling height > 20 ft, y = 0
For SI units, 1 ft = 0.31 m.

Revise Section 19.2.3.2.3.2 as follows:

19.2.3.2.3.2 *The number of sprinklers in the design area shall never be less than seven.*

Revise Section 20.9.5.2 as follows:

20.9.5.2 *Early suppression fast-response (ESFR) sprinklers shall not be used in buildings with automatic heat or smoke vents unless the vents use a standard-response operating mechanism with a minimum temperature rating of 360°F (182°C) or 100°F (56°C) above the operating temperature of the sprinklers, whichever is higher.*

Add Section 28.1.3(18)(e)* as follows:

28.1.3(18)(e)* *Where a waterflow test is used for the purposes of system design, the test shall be conducted no more than 6 months prior to working plan submittal unless otherwise approved by the authority having jurisdiction.*

Revise Section 29.1 as follows:

29.1 Approval of Sprinkler Systems and Private Fire Service Mains. *The installing contractor shall do the following:*

(1) Notify the authority having jurisdiction and the property owner or property owner's authorized representative of the time and date testing will be performed.

(2) Perform all required testing (see Section 29.2).

(3) Complete and sign the appropriate contractor's material and test certificate(s) (see Figure A.29.1).

(4) Remove all caps and straps prior to placing the sprinkler system in service.

(5) Upon system acceptance by the authority having jurisdiction a label prescribed by Title 19 California Code of Regulations, Chapter 5 shall be affixed to each system riser.

Revise Section 29.3 as follows:

29.3 Instructions. *The installing contractor shall provide the property owner or the property owner's authorized representative with the following:*

(1) All literature and instructions provided by the manufacturer describing proper operation and maintenance of any equipment and devices installed.

(2) NFPA 25, Standard for the Inspection, testing, and maintenance of Water-Based Fire Protection Systems, 2013 California Edition.

(3) Title 19, California Code of Regulations, Chapter 5, "Fire Extinguishing Systems."

Revise Section 29.4.1 as follows:

29.4.1 *The installing contractor shall identify a hydraulically designed sprinkler system with a permanently marked weatherproof metal or rigid plastic sign secured with corrosion resistant wire, chain or other approved means. Such signs shall be placed at the alarm valve, dry pipe valve,*

preaction valve or deluge valve supplying the corresponding hydraulically designed area. Pipe schedule systems shall be provided with a sign indicating that the system was designed and installed as a pipe schedule system and the hazard classification(s) included in the design.

Revise Section 29.4.3 as follows:

29.4.3 *The sign shall include the following information:*

(1) Location of the design area or areas

(2) Discharge densities over the design area or areas

(3) Required flow and pressure of the system at the base of the riser.

(4) Occupancy classification or commodity classification and maximum permitted storage height and configuration

(5) Hose stream allowance included in addition to the sprinkler demand

(6) The name of the installing contractor

(7) Required flow and pressure of the system at the water supply source.

(8) Required flow and pressure of the system at the discharge side of the fire pump where a fire pump is installed.

(9) Type or types and number of sprinklers or nozzles installed including the orifice size, temperature rating, orientation, K-Factor, sprinkler identification number (SIN) for sprinkler heads when applicable, and response type.

(10) The minimum discharge flow rate and pressure required from the hydraulically most demanding sprinkler.

(11) The required pressure settings for pressure reducing valves.

(12) For deluge sprinkler systems, the required flow and pressure at the hydraulically most demanding sprinkler or nozzle.

(13) The protection area per sprinkler based on the hydraulic calculations.

(14) The edition of NFPA 13 to which the system was designed and installed.

Revise Section 29.6.1 as follows:

29.6.1 *The installing contractor shall provide a general information sign used to determine system design basis and information relevant to the inspection, testing, and maintenance requirements required by NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2013 California Edition.*

13D—*25*: Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes *as amended**

903.3.1.3

****NFPA 13D, Amended Sections as follows:***

Revise Section 6.2.2 to read as follows:

6.2.2 Where a *well,* pump, tank *or combination thereof* is the source of supply for a fire sprinkler system, *the configuration for the system shall be one of the following:*

(1) The water supply shall serve both domestic and fire sprinkler systems.

(a) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.

(b) Any disconnecting means for the pump shall be approved.

(c) A method for refilling the tank shall be piped to the tank.

(d) A method of seeing the water level in the tank shall be provided without having to open the tank.

(e) The pump shall not be permitted to sit directly on the floor.

(2) A stand-alone tank is permitted if the following conditions are met:

(a) The pump shall be connected to a 220-volt circuit breaker shared with a common household appliance (e.g., range, oven, dryer),

(b) The pump shall be a stainless steel 240-volt pump,

(c) A valve shall be provided to exercise the pump. The discharge of the exercise valve shall drain to the tank, and

(d) A sign shall be provided stating: "Valve must be opened monthly for 5 minutes."

(e) A means for automatically refilling the tank level, so that the tank capacity will meet the required water supply duration in minutes, shall be provided.

(f) A test connection shall be provided downstream of the pump that creates a flow of water equal to the smallest sprinkler on the system. The connection shall return water to the tank.

(g) Any disconnecting means for the pump shall be approved.

(h) A method for refilling the tank shall be piped to the tank.

(i) A method of seeing the water level in the tank shall be provided without having to open the tank.

(j) The pump shall not be permitted to sit directly on the floor.

Add new Section 6.2.2.1 as follows:

6.2.2.1 *Where a fire sprinkler system is supplied by a stored water source with an automatically operated means of pressurizing the system other than an electric pump, the water supply may serve the sprinkler system only.*

Add new Section 6.2.4 as follows:

6.2.4 *Where a water supply serves both domestic and fire sprinkler systems, 5 gpm (19 L/min) shall be added to the sprinkler system demand at the point where the systems are connected, to determine the size of common piping and the size of the total water supply requirements where no provision is made to prevent flow into the domestic water system upon operation of a sprinkler. For multipurpose piping systems, the 5 gpm (19 L/min) demand shall be added at the domestic connection nearest the design area. This demand may be split between two domestic connections at 2.5 gpm (10 L/min) each.*

Revise Section 8.3.4 as follows:

8.3.4* Sprinklers shall not be required in *detached* garages, open attached porches, carports *with no habitable space above,* and similar structures.

Add new Sections 8.3.11 and 8.3.11.1 as follows:

8.3.11 Solar photovoltaic panel structures

8.3.11.1 *Sprinklers shall be permitted to be omitted from the following structures:*

(1) Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath including storage.

(2) Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.

13R—*25*: Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies, *as amended**

903.3.1.2, 903.3.5.2, 903.4.1

NFPA 13R, Amended Sections as follows:

Revise Section 2.2 and add publications as follows:

2.2 NFPA Publications.

NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2013 California edition.

Add new Sections 6.6.10 and 6.10.1 as follows:

6.6.10 Solar photovoltaic panel structures

6.6.10.1 *Sprinklers shall be permitted to be omitted from the following structures:*

(1) Solar photovoltaic panel structures with no use underneath. Signs may be provided, as determined by the enforcing agency prohibiting any use underneath including storage.

(2) Solar photovoltaic (PV) panels supported by framing that have sufficient uniformly distributed and unobstructed openings throughout the top of the array (horizontal plane) to allow heat and gases to escape, as determined by the enforcing agency.

Revise Section 11.4 as follows:

11.4 Instructions.

The installing contractor shall provide the property owner or the property owner's authorized representative with the following:

(1) All literature and instructions provided by the manufacturer describing proper operation and maintenance of any equipment and devices installed.

(2) NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems 2013 California Edition and Title 19, California Code of Regulations, Chapter 5.

(3) Once the system is accepted by the authority having jurisdiction a label as prescribed by Title 19, California Code of Regulations, Chapter 5, shall be affixed to each system riser.

14—*24*: Standard for the Installation of Standpipe and Hose Systems, *as amended**

905.2, 905.3.4, 905.4.2, 905.6.2, 905.8

NFPA 14, Amended Sections as follows:

Replace Section 6.3.7.1

6.3.7.1 *System water supply valves, isolation control valves, and other valves in fire mains shall be supervised in an approved manner in the open position by one of the following methods:*

(1) Where a building has a fire alarm system or a sprinkler monitoring system installed, the valve shall be supervised by:

(a) a central station, proprietary or remote supervising station, or

(b) a local signaling service that initiates an audible signal at a constantly attended location.

(2) Where a building does not have a fire alarm system or a sprinkler monitoring system installed, the valve shall be supervised by:

(a) Locking the valves in the open position, or

(b) Sealing of valves and an approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner.

15—22: Standard for Water Spray Fixed Systems for Fire Protection
1207.5.5, 5704.2.9.2.3

17—*24*: Standard for Dry Chemical Extinguishing Systems
Table 901.6.1, 904.6, 904.14

17A—*24*: Standard for Wet Chemical Extinguishing Systems
Table 901.6.1, 904.5, 904.14

20—*25*: Standard for the Installation of Stationary Pumps for Fire Protection
913.1, 913.2, 913.5.1

22—23: Standard for Water Tanks for Private Fire Protection
507.2.2

24—*25*: Standard for Installation of Private Fire Service Mains and Their Appurtenances, *as amended**
507.2.1, 2809.5, *3109F*

NFPA 24, Amended Sections as follows:

Amend Section 4.2.1 as follows:

Section 4.2.1. Installation work shall be done by fully experienced and responsible *contractors. Contractors shall be appropriately licensed in the State of California to install private fire service mains and their appurtenances.*

Revise Section 4.2.2 as follows:

4.2.2 *Installation or modification of private fire service mains shall not begin until plans are approved and appropriate permits secured from* the authority having jurisdiction.

Add Section 4.2.2.1 as follows:

4.2.2.1 *As approved by the authority having jurisdiction, emergency repair of existing system may start immediately, with plans being submitted to the authority having jurisdiction within 96 hours from the start of the repair work.*

Revise Section 5.9.5.1 as follows:

5.9.5.1 Fire department connections shall be on the street side of buildings and *as approved by the authority having jurisdiction.*

Add Sections 6.6.1.1, 6.6.1.2, 6.6.1.3 and 6.6.1.4 as follows:

6.6.1.1 *Sectional control valves are not required when the fire service main system serves less than six fire appurtenances.*

6.6.1.2 *Sectional control valves shall be indicating valves in accordance with NFPA 13, Section 6.7.1.3.*

6.6.1.3 *Sectional control valves shall be located so that no more than five fire appurtenances are affected by shut-down of any single portion of the fire service main. Each fire hydrant, fire sprinkler system riser and standpipe riser shall be considered a separate fire appurtenance. In-rack sprinkler systems shall not be considered as a separate appurtenance.*

6.6.1.4 *The number of fire appurtenances between sectional control valves is allowed to be modified by the authority having jurisdiction.*

Revise Section 10.4.3.1.1 as follows:

10.4.3.1.1 Pipe joints shall not be located under foundation footings. *The pipe under the building or building foundation shall not contain mechanical joints.*

Exceptions:

1. Where allowed in accordance with 10.4.3.2.

2. Alternate designs may be utilized where designed by a registered professional engineer and approved by the enforcing agency.

Revise Section 10.9.1 as follows:

10.9.1 *Backfill shall be well tamped in layers or puddle under and around pipes to prevent settlement or lateral movement.* Backfill shall consist of clean fill sand or pea gravel to a minimum 6″ below and to a minimum of 12″ above the pipe *and shall contain no ashes, cinders, refuse, organic matter or other corrosive materials. Other backfill materials and methods are permitted where designed by a registered professional engineer and approved by the enforcing agency.*

25—13CA: California NFPA 25 Edition (Based on the 2011 Edition) *Inspection, Testing and Maintenance of Water-based Fire Protection Systems*
Chapter 31F, 3108F

30—24: Flammable and Combustible Liquids Code
607.1, 5001.1, 5701.2, 5703.6.2, 5703.6.2.1, 5704.2.7, 5704.2.7.1, 5704.2.7.2, 5704.2.7.3.2, 5704.2.7.4, 5704.2.7.6, 5704.2.7.7, 5704.2.7.8, 5704.2.7.9, 5704.2.9.3, 5704.2.9.4, 5704.2.9.6.1.1, 5704.2.9.6.1.2, 5704.2.9.6.1.3, 5704.2.9.6.1.4, 5704.2.9.6.1.5, 5704.2.9.6.2, 5704.2.9.7.3, 5704.2.10.2, 5704.2.11.3, 5704.2.11.4.2, 5704.2.12.1, 5704.3.1, 5704.3.6, Table 5704.3.6.3(1), Table 5704.3.6.3(2), Table 5704.3.6.3(3), 5704.3.7.2.3, 5704.3.8.4, 5706.8.3

30A—24: Code for Motor Fuel Dispensing Facilities and Repair Garages
2301.4, 2301.5, 2301.6, 2306.6.3, 2310.1

30B—23: Code for the Manufacture and Storage of Aerosol Products
5101.1, 5103.1, 5104.1, Table 5104.3.1, Table 5104.3.2, Table 5104.3.2.2, 5104.3.3, 5104.4.1, 5104.5.2, 5104.6, 5104.8.2, 5106.2.2, 5106.2.4, 5106.3.2, Table 5106.4, 5106.5.1, 5106.5.6, 5107.1

31—*24*: Standard for the Installation of Oil-Burning Equipment
605.1.6, 605.4.1, 605.4.3

32—21: Standard for Drycleaning Facilities, *as amended**
2101.1.1, 2107.1, 2107.3

NFPA 32, Amended Sections as follows:

Delete the following publications from Section 2.2:

2.2 NFPA Publications.

NFPA 10*, Standard for Portable Fire Extinguishers,* 2010 edition.
NFPA 25*, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems, 2011 edition.*
NFPA 70*, National Electrical Code®,* 2011 edition.
NFPA *101®, Life Safety Code®,* 2009 edition.
NFPA 5000®*, Building Construction and Safety Code®,* 2009 edition.

Revise Section 4.4.1.1 as follows:

4.4.1.1 General building and structure design and construction shall be in accordance with *California Building Code.*

Delete language to Sections 4.4.1.2 and 4.4.1.3 and reserve section numbers.

4.4.1.2 Reserved

4.4.1.3 Reserved

Revise Section 4.4.4 as follows:

4.4.4 Means of Egress. Means of egress shall conform with the provisions of *the California Building Code.*

Revise Section 4.6.2 as follows:

4.6.2 Automatic Sprinkler Systems. Where required by this standard, automatic sprinkler systems shall be installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems,* and periodically inspected, tested and maintained in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 5.*

Revise Section 4.6.4 as follows:

4.6.4 Portable Fire Extinguishers. Suitable numbers and types of portable fire extinguishers shall be installed and maintained throughout the drycleaning plant in accordance with *California Code of Regulations, Title 19, Division 1, Chapter 3.*

Revise Section 7.3.2 as follows:

7.3.2 Electrical Installations. Electrical equipment and wiring in a Type II drycleaning room shall comply with the provisions of *California Electrical Code,* for use in Class I, Division 2 hazardous locations.

33—*24*: Standard for Spray Application Using Flammable or Combustible Materials
2404.3, 2404.5.3, 2404.5.5

34—*24*: Standard for Dipping, Coating, and Printing Processes Using Flammable or Combustible Liquids
2405.3, 2405.4.1.1

35—21: Standard for the Manufacture of Organic Coatings
2901.3, 2905.4

37—18: Installation and Use of Stationary Combustion Engines and Gas Turbines

40—*25*: Standard for the Storage and Handling of Cellulose Nitrate Film
306.2

45—*24*: Standard on Fire Protection for Laboratories Using Chemicals
3803.1.5, 3804.1.1.7, 3805.2.1, 3805.2.2

51—23: Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes
3501.5, 3507.1, 3509.1

52—*23*: Vehicular Natural Gas Fuel System Code
5301.1

54—18: National Fuel Gas Code

55—23: Compressed Gases and Cryogenic Fluids Code
3508.1, 5301.1, 5307.4.2, 5501.1, 5801.1, 6301.1

56—23: Standard for Fire and Explosion Prevention during Cleaning and Purging of Flammable Gas Piping Systems
3309.2.2

58—*24*: Liquefied Petroleum Gas Code
2311.5, 3903.6, 4101.6.4, 6101.1, 6103.1, 6103.2.1, 6103.2.1.2, 6103.2.1.7, 6103.2.2, 6104.1, 6104.3.2, 6104.4, 6105.2, 6106.2, 6106.3, 6107.2, 6107.4, 6108.1, 6108.2, 6109.11.2, 6111.3

59A—*24*: Standard for the Production, Storage, and Handling of Liquefied Natural Gas (LNG)

5301.1, 5501.1

61—20: Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

Table 2205.1

68—23: Standard on Explosion Protection by Deflagration Venting

Table 414.5.1, 911.1, 911.4, Table 2205.1

69—*24*: Standard on Explosion Prevention Systems

911.1, 911.3, Table 2205.1

70—23: National Electrical Code

309.2, 603.1, 603.1.1, 603.2.1, 603.4, 603.4.3, 603.5, 603.8, 605.1.2, 605.1.6, 605.5.2, 607.6, 607.7, 608.17, 904.3.1, 907.6.1, 909.12.2, 909.16.3, 910.4.6, 1006.2.2.4, 1010.2.8.2, 1201.2, 1203.1.3, 1205.1, 1206.4, 1206.13, 1207.4.1, 1207.4.2, 1207.4.8, 1207.5.3, 1207.10.6, 1207.10.7.4, 1207.11.5, 1207.11.9, 2006.3.4, 2104.2.3, 2108.2, 2203.4.1, 2203.5, Table 2205.1, 2301.5, 2305.4, 2308.8.1.2.4, 2309.2.3, 2311.3.1, 2311.8.10, 2403.2.1, 2403.2.1.1, 2403.2.1.4, 2403.2.5, 2404.11.4, 2504.5, 2603.2.1, 2703.7.1, 2703.7.2, 2703.7.3, 2803.4, 2904.1, 3103.11.6.1, 3107.6, 3305.6, 3506.4, 3901.4, 4003.3.3, 4003.4, 4101.5, 5003.8.7.1, 5003.9.4, 5303.7.6, 5303.8, 5303.16.11, 5303.16.14, 5503.6, 5503.6.2, 5703.1, Table 5703.1.1, 5703.1.3, 5704.2.8.12, 5704.2.8.17, 5706.2.8, 5803.1.5, 5803.1.5.1, 5807.1.10, 5906.5.5, 5906.5.6, 6109.15.1

72—*25*: National Fire Alarm and Signaling Code, *as amended**

508.1.6, *604.6.3*, Table 901.6.1, 903.4.2, 904.3.5, 907.1.2, *907.1.5*, 907.2, 907.2.6, *907.2.6.3.3,* 907.2.9.3, 907.2.11, *907.2.11.8,* 907.2.13.2, *907.2.26.1, 907.2.26.4,* 907.3, 907.3.3, 907.3.4, 907.5.2.1.2, 907.5.2.1.3, *907.5.2.1.3.1,* 907.5.2.1.3.2, 907.5.2.2, 907.5.2.2.5, *907.5.2.3.4,* 907.6, 907.6.1, *907.6.1.1,* 907.6.2, *907.6.4.1,* 907.6.6, *907.6.6.1, 907.6.6.4,* 907.7, 907.7.1, 907.7.2, 907.8, 907.8.2, *907.8.2.4,* 907.8.4, 915.3.2, 915.3.3, 915.3.4, 915.5.2, 915.6, 917.1, *1009.12*, 1032.8, 1103.3.2, 1203.2.4, 1207.5.4, 1207.6.1.2.3, 1207.6.1.2.4, Table 1207.7, 2810.11

****NFPA 72, Amended Sections as follows:***

Revise Section 10.3.1 as follows:

10.3.1 Equipment constructed and installed in conformity with this Code shall be listed for the purpose for which it is used. *Fire alarm systems and components shall be California State Fire Marshal approved and listed in accordance with California Code of Regulations, Title 19, Division 1.*

Revise Section 10.3.3 as follows:

10.3.3 All devices and appliances that receive their power from the initiating device circuit or signaling line circuit of a control unit shall be *California State Fire Marshal* listed for use with the control unit.

Revise Section 12.3.8.1 as follows:

12.3.8.1 The outgoing and return (redundant) circuit conductors shall be permitted in the same cable assembly (i.e., multiconductor cable), enclosure or raceway only under the following conditions:

(1) For a distance not to exceed 10 ft (3.0 m) where the outgoing and return conductors enter or exit the initiating device, notification appliance or control unit enclosures.

(2) Single drops installed in the raceway to individual devices or appliances.

(3)*In a single room not exceeding 1000 ft^2 (93 m^2) in area, a drop installed in the raceway to multiple devices or appliances that does not include any emergency control function devices.

(4) Where the vertically run conductors are contained in a 2-hour rated cable assembly, or enclosed (installed) in a 2-hour rated enclosure or a listed circuit integrity (C.I.) cable, which meets or exceeds a 2-hour fire-resistive rating.

Revise Section 14.4.6.1 as follows:

14.4.6.1 Testing. Household fire alarm systems shall be tested in *accordance with the manufacturer's published instructions* according to the methods of Table 14.4.3.2.

Revise Section 17.18 as follows:

17.*18 Fire Extinguisher Electronic Monitoring Device.* A fire extinguisher electronic monitoring device shall indicate those conditions for a specific fire extinguisher required by *California Code of Regulations, Title 19, Division 1, Chapter 1, Section 574.2 (c) and California Fire Code to a fire alarm control unit.*

Delete the amendments to Section 21.3.6 and adopt the model text.

Revise Section 12.3.8 as follows:

12.3.8*(5)* Where the vertically run conductors are contained in a 2-hour rated cable assembly, or enclosed (installed) in a 2-hour rated enclosure or a listed circuit integrity (C.I.) cable, which meets or exceeds a 2-hour fire resistive rating.

23.8.1.2 Positive Alarm Sequence

23.8.1.2.1 *Systems that have positive alarm features complying with 23.8.1.2 shall be permitted if approved by the authority having jurisdiction. Operation of a patient room smoke detector in Group I-2 and R-2.1 occupancies shall not include a positive alarm sequence feature.*

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Revise Section 23.8.5.1.2 as follows:

23.8.5.1.2* Where connected to a supervising station, fire alarm systems employing automatic fire detectors or waterflow detection devices shall include a manual fire alarm box to initiate a signal to the supervising station.

Exception: Fire alarm systems dedicated to elevator recall control, supervisory service and fire sprinkler monitoring *as permitted in section 17.15 of NFPA 72.*

Revise Section 23.8.5.4.1 as follows:

23.8.5.4.1 Systems equipped with alarm verification features shall be permitted under the following conditions:

(1) The alarm verification feature is not initially enabled unless conditions or occupant activities that are expected to cause nuisance alarms are anticipated in the area that is protected by the smoke detectors. Enabling of the alarm verification feature shall be protected by password or limited access.

(2) A smoke detector that is continuously subjected to a smoke concentration above alarm threshold does not delay the system functions of Sections 10.7 through 10.16, 23.8.1.1 or 21.2.1 by more than 30 seconds.

(3) Actuation of an alarm-initiating device other than a smoke detector causes the system functions of Sections 10.7 through 10.16, 23.8.1.1 or 21.2.1 without additional delay.

(4) The current status of the alarm verification feature is shown on the record of completion *(see Figure 7.8.2(a), Item 4.3).*

(5) Operation of a patient room smoke detector in I-2 and R-2.1 occupancies shall not include an alarm verification feature.

Revise Section 29.3.1 as follows:

29.3.1 All devices, combinations of devices, and equipment to be installed in conformity with this chapter shall be approved *and* listed *by the California State Fire Marshal* for the purposes for which they are intended.

Revise Section 29.8.2.1.1 as follows:

29.8.2.1.1* Smoke and Heat Alarms. *Where connected to a supervising station unless* exempted by applicable laws, codes or standards, smoke or heat alarms used to provide a fire-warning function, and when two or more alarms are installed within a dwelling unit, suite of rooms or similar area, shall be arranged so that the operation of any smoke or heat alarm causes all alarms within these locations to sound.

*Note: Exception to **29.8.2.1.1** not adopted by the SFM.*

Add Section 29.10.2.1 as follows:

29.10.2.1 *The alarm verification feature shall not be used for household fire warning equipment.*

Add Section 29.10.6.8.1 as follows:

29.10.6.8.1 *The alarm verification feature shall not be used for household fire warning equipment.*

76—*24*: Standard for the Fire Protection of Telecommunications Facilities

1207.1.4.1, 1207.2.1, 1207.3.1, 1207.3.7.1, 1207.4.1, 1207.5.1, 1207.5.2, 1207.5.3, 1207.5.5, Table 1207.6, 1207.6.2.3, Table 1207.7,

77—24: Recommended Practice on Static Electricity

Table 2205.1

80—*25*: Standard for Fire Doors and Other Opening Protectives

705.2, 705.2.7, 706.1, Table 901.6.1, 909.18.3, 1010.3.3, 1032.2.3

85—23: Boiler and Combustion Systems Hazards Code

Table 2205.1

86—23: Standard for Ovens and Furnaces

3001.1

92—*24*: Standard for Smoke Control Systems

909.7, 909.8

96—24: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

606.2, 904.14, 4106.1, 4106.4.1

99—24: Health Care Facilities Code

603.1.2, 603.5.1.1, 609.1, 1105.11.1, 1105.11.2, 1203.4.1, 1203.5.1, 5003.7.4, 5306.4, 5306.5

101—24: Life Safety Code

1030.6.2

105—*25*: Standard for Smoke Door Assemblies and Other Opening Protectives

705.2, 706.1, Table 901.6.1, 909.18.3

110—*25*: Standard for Emergency and Standby Power Systems

913.5.2, 913.5.3, 1203.1.3, 1203.4, 1203.5, *3111F*

111—*25*: Standard on Stored Electrical Energy Emergency and Standby Power Systems

1203.1.3, 1203.4, 1203.5,*3111F*

120—*23*: Standard for Fire Prevention and Control in Coal Mines
Table 2205.1

160—21: Standard for the Use of Flame Effects Before an Audience
308.3.2

170—*24*: Standard for Fire Safety and Emergency Symbols
1025.2.6.1

204—*24*: Standard for Smoke and Heat Venting
Table 901.6.1, 910.5.1, 910.5.2

232—22: Standard for the Protection of Records
3210.1.1

241—22: Standard for Safeguarding Construction, Alteration and Demolition Operations
3301.1, 3303.2

253—23: Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
804.3.1, 804.3.2, 804.4

260—*24*: Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture
805.1.1.1, 805.2.1.1, 805.3.1.1, 805.4.1.1

261—23: Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes
805.1.1.1, 805.2.1.1, 805.3.1.1, 805.4.1.1

265—23: Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile or Expanded Vinyl Wall Coverings on Full Height Panels and Walls
803.5.1, 803.5.1.1

286—*24*: Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
803.1, 803.1.1, 803.1.1.1, 803.3, 803.12, 803.13, 804.1.1, 804.2.4

289—23: Standard Method of Fire Test for Individual Fuel Packages
807.3, 807.4.1, 807.5.1.1, 808.2

303—21: Fire Protection Standard for Marinas and Boatyards
3603.5, 3603.6, 3604.2

318—*25*: Standard for the Protection of Semiconductor Fabrication Facilities
2703.16

326—*25*: Standard for the Safeguarding of Tanks and Containers for Entry, Cleaning, or Repair
3510.1

385—22: Standard for Tank Vehicles for Flammable and Combustible Liquids
5706.5.4.5, 5706.6, 5706.6.1, 5707.2

400—*25*: Hazardous Materials Code
5601.1.5, Table 6303.1.4, 6304.1.2, Table 6304.1.5(1), Table 6304.1.5(2)

407—22: Standard for Aircraft Fuel Servicing
2006.2, 2006.3

409—22: Standard on Aircraft Hangars
914.8.3, Table 914.8.3, 914.8.3.1, 914.8.6

410—*25*: Standard on Aircraft Maintenance
2004.7

484—22: Standard for Combustible Metals
319.3.4, 319.3.6, Table 2205.1

495—23: Explosive Materials Code
202, 911.1, 911.5, 5601.1.1, 5601.1.5, 5604.2, 5604.6.2, 5604.6.3, 5604.7.1, 5605.1, 5605.2.3, 5606.1, 5606.5.2.1, 5607.1, 5607.9, 5607.11, 5607.15

498—23: Standard for Safe Havens and Interchange Lots for Vehicles Transporting Explosives
5601.1.2

502—14: Standard for Road Tunnels, Bridges, and Other Limited Access Highways
429

505—*24*: Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations
309.2, 4003.3.3

652—19: Standard on the Fundamentals of Combustible Dust
319.3.4, 2203.4.8, 2203.5, 2204.1, 2204.2, 2205.1.1

654—20: Standard for Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
319.3.5, 2203.1, 2203.5, Table 2205.1

655—19: Standard for the Prevention of Sulfur Fires and Explosions
Table 2205.1

664—20: Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities
2203.1, 2203.5, Table 2205.1, 2805.3

701—23: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
807.3, 807.4.1, 807.5.1.2, 2603.5, 3104.2, 3106.3

703—24: Standard for Fire Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials
803.4

704—22: Standard System for the Identification of the Hazards of Materials for Emergency Response
202, 608.8, 5003.2.2.2, 5003.5, 5003.10.2, 5005.1.10, 5005.1.12, 5005.2.1.1, 5005.4.4, 5503.4.1, 5704.2.3.2

750—23: Standard on Water Mist Fire Protection Systems
202, Table 901.6.1, 904.11.1.1, 904.14, 1207.5.5

770—21: Standard on Hybrid (Water and Inert Gas) Fire-Extinguishing Systems
904.13

780—23: Standard for the Installation of Lightning Protection Systems
4003.4

853—20: Standard for the Installation of Stationary Fuel Cell Power Systems
1206.3, 1206.4, 1206.6.2, 1206.11, 1206.12,

855—*23*: Standard for the Installation of Stationary Energy Storage Systems
1201.1

914—*24*: Code for the Protection of Historic Structures
1103.1.1

1122—*22*: Code for Model Rocketry
5601.1.4

1123—22: Code for Fireworks Display
202, 5604.2, 5608.1, 5608.2.2, 5608.5, 5608.6

1124—06: Code for the Manufacture, Transportation, Storage, and Retail Sales of Fireworks and Pyrotechnic Articles
5601.1.3

1124—22: Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles
202, 5604.2, 5605.1, 5605.3, 5605.4, 5605.5, 5609.1

1125—22: Code for the Manufacture of Model Rocket and High-Power Rocket Motors
5601.1.4

1126—21: Standard for the Use of Pyrotechnics Before a Proximate Audience
5604.2, 5605.1, 5608.1, 5608.2.2, 5608.4, 5608.5

1127—18: Code for High-Power Rocketry
5601.1.4

1142—22: Standard on Water Supplies for Suburban and Rural Firefighting
B103.3

1225—22: Standard for Emergency Services Communications
510.4.2, 510.5

2001—22: Standard on Clean Agent Fire Extinguishing Systems, *as amended**
Table 901.6.1, 904.10, 1207.5.5

NFPA 2001, Amended Sections as follows:

Add Sections 4.3.5.1.1 and 4.3.5.2.1 to read as follows:

4.3.5.1.1 *Alarms signals from the fire extinguishing system shall not interfere with the building fire alarm signal.*

4.3.5.2.1 *The lens on visual appliances shall be "red" in color.*

Exception: *Other lens colors are permitted where approved by the enforcing agency.*

2010—*23*: Standard for Fixed Aerosol Fire-Extinguishing Systems
Table 901.6.1, 904.13, 1207.5.5

SFM *State of California, Department of Forestry and Fire Protection, Office of the State Fire Marshal, P.O. Box 944246 Sacramento, CA 94246-2460*

SFM 12-3: Releasing Systems for Security Bars in Dwellings

SFM 12-7-3: Fire-testing Furnaces

SFM 12-7A-1: Exterior Wall Siding and Sheathing

SFM 12-7A-2: Exterior Window

SFM 12-7A-3: Under Eave

SFM 12-7A-4: Decking

SFM 12-7A-4A: Decking Alternate Method A

SFM 12-7A-5: Ignition Resistant Building Material

SFM 12-8-100: Room Fire Tests for Wall and Ceiling Materials

SFM 12-10-1: Power Operated Exit Doors

SFM 12-10-2: Single Point Latching or Locking Devices

SFM 12-10-3: Emergency Exit and Panic Hardware

(The Office of the State Fire Marshal standards referred to above are found in the California Code of Regulations, Title 24, Part 12.)

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10C—2016: Positive Pressure Fire Tests of Door Assemblies—with Revisions through May 2021
1010.2.8.3

13—96: Power-limited Circuit Cables

30—1995: Metal Safety Cans—with Revisions through September 2019
5003.9.10, 5005.1.10, 5705.2.4, 5707.2

38—99: Manually Actuated Signaling Boxes—with Revisions through February 2, 2005 as amended.*

****Amend Section 14.1.5 as follows:***

14.1.5 A signaling box having a glass panel, disc, rod or similar part that must be broken to operate it for a signal or for access to its actuating means shall satisfactorily complete five part-breaking operations using the means provided with the box, without jamming of the mechanism or other interference by broken particles. It shall be practicable to remove and replace the broken parts. *A signaling box shall not have a glass panel, disc, rod or similar part requiring a striking action by grasping a tool to operate it for a signal. The force required to activate controls shall be no greater than 5 pounds (22 N) of force.*

****Add Appendix B chapter to UL 38 (1999) as follows:***

Appendix B,

14.1.5 Operation. *Controls and operating mechanisms shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist.*

58—2018: Steel Underground Tanks for Flammable and Combustible Liquids
5704.2.13.1.5

80—2007: Steel Tanks for Oil-Burner Fuels and Other Combustible Liquids—with Revisions through April 2019
605.4.2.1, 605.4.2.2, 607.2

87A—2015: Power-Operated Dispensing Devices for Gasoline and Gasoline/Ethanol Blends with Nominal Ethanol Concentrations up to 85 Percent—with Revisions through September 2019
2306.8.1

142—2006: Steel Aboveground Tanks for Flammable and Combustible Liquids—with Revisions through January 2021
605.4.1.1, 605.4.2.1, 605.4.2.2, 607.2, 2306.2.3

193—04: Alarm Valves for Fire-Protection Service

199—95: Automatic Sprinklers for Fire Protection Service—with Revisions through August 19, 2005

199E—2004: Outline of Investigation for Fire Testing of Sprinklers and Water Spray Nozzles for Protection of Deep Fat Fryers
904.14.4.1

217—2015: Smoke Alarms—with Revisions through April 2021
907.2.11, 915.4.3

228—97: Door Closers/Holders, with or without Integral Smoke Detectors—with Revisions through January 26, 2006

260—04: Dry Pipe and Deluge Valves for Fire Protection Service

262—04: Gate Valves for Fire Protection Service

268—2016: Smoke Detectors for Fire Alarm Systems—with revisions through October 2019
907.2.6.2, 907.2.11.7, 915.5.3

268A—09: Smoke Detectors for Duct Application—with Revisions through October 22, 2003

294—2018: Access Control System Units—with Revisions through October 2018
1010.2.10, 1010.2.11, 1010.2.12.1, 1010.2.13, 1010.2.14,

300—2019: Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment
904.14

300A—2006: Outline of Investigation for Extinguishing System Units for Residential Range Top Cooking Surfaces
904.15.1.1

305—2012: Panic Hardware—with Revisions through March 2017
1010.2.8.3

312—04: Check Valves for Fire-Protection Service

325—2017: Door, Drapery, Gate, Louver and Window Operators and Systems—with Revisions through February 2020
503.5, 503.6

346—05: Waterflow Indicators for Fire Protective Signaling Systems

464—03: Audible Signal Appliances—with Revisions through October 10, 2003

497B—04: Protectors for Data Communication and Fire Alarm Circuits

498A—2008: Current Taps and Adaptors—with Revisions through June 2016
603.5.1

499—2014: Standard for Electric Heating Appliances—with Revisions through February 2017
607.6

521—99: Heat Detectors for Fire Protective Signaling Systems—with Revisions through July 20, 2005

539—00: Single- and Multiple-Station Heat Detectors—with Revisions through August 15, 2005

632—00: Electrically Actuated Transmitters

647—1993: Standard for Unvented Kerosene-Fired Room Heaters and Portable Heaters—with Revisions through April 2010
4103.1

710—2012: Exhaust Hoods for Commercial Cooking Equipment—with Revisions through February 2021
606.2

710B—2011: Recirculating Systems—with Revisions through February 2019
606.2, 904.14

723—2018: Standard for Test for Surface Burning Characteristics of Building Materials
202, 803.1, 803.1.2, 803.3, 803.5.2, 803.10, 803.12, 803.13, 804.1.1, 804.1.2, 804.2.4, 3311.1

753—04: Alarm Accessories for Automatic Water Supply Valves for Fire Protection Service

790 *Edition 9—2022*: Standard Test Methods for Fire Tests of Roof Coverings—with Revisions through October 2018
1207.9.5

791—2006: Residential Incinerators—with Revisions through February 2021
605.7.1, *605.8*

***793—2008:* Automatically Operated Roof Vents for Smoke and Heat—with Revisions through March 2017**
910.3.1

813—96: Commercial Audio Equipment—with Revisions through December 7, 1999

817—2015: Standard for Cord Sets and Power-Supply Cords—with Revisions through September 2021
603.6

864—2014: Control Units and Accessories for Fire Alarm Systems—with Revisions through May 2020
909.12

***Amend No. 55.1 as follows:**

RETARD-RESET-RESTART PERIOD – MAXIMUM 30 SECONDS —*No alarm obtained from control unit. Maximum permissible time is 30 seconds.*

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Amend Section 55.2.2 as follows:

Where an alarm verification feature is provided, the maximum retard-reset-restart period before an alarm signal can be confirmed and indicated at the control unit, including any control unit reset time and the power-up time for the detector to become operational for alarm, shall not exceed 30 seconds. (The balance of the section text is to remain unchanged).

Add Section 55.2.9 as follows:

Smoke detectors connected to an alarm verification feature shall not be used as releasing devices.

Exception: *Smoke detectors which operate their releasing function immediately upon alarm actuation independent of alarm verification feature.*

Amend Section 89.1.10 as follows:

The existing text of this section is to remain as printed with one editorial amendment as follows:

THE TOTAL DELAY (CONTROL UNIT PLUS SMOKE DETECTORS) SHALL NOT EXCEED 30 SECONDS.

(The balance of the section text is to remain unchanged).

900—2015: Air Filter Units
2404.9.8

924—2016: Standard for Emergency Lighting and Power Equipment—with Revisions through May 2020
1013.5, 3103.11.6.1

971A—2006: Outline of Investigation for Metallic Underground Fuel Pipe
Table 5703.6.2

1034—2011: Burglary-Resistant Electric Locking Mechanisms—with Revisions through June 2020
1010.2.10, 1010.2.11, 1010.2.12.1, 1010.2.13, 1010.2.14

1037—2016: Antitheft Alarms and Devices—with Revisions through September 2017
506.1

1046—2010: Grease Filters for Exhaust Ducts—with Revisions through April 2017
606.3.1

1275—2021: Flammable Liquid Storage Cabinets
5003.8.7.1, 5704.3.2.1.1

1313—2015: Nonmetallic Safety Cans for Petroleum Products
5003.9.10

1315—2017: Safety for Metal Waste Paper Containers
304.3.6, 304.3.7, 808.1, 808.2

1316—2018: Fibre Reinforced Underground Tanks for Flammable and Combustible Liquids—with Revisions through March 2019
5704.2.13.1.5

1363—2018: Relocatable Power Taps
603.5.1

1363A—2014: Outline of Investigation for Special Purpose Relocatable Power Taps
603.5.1.1

1369—2018: Aboveground Piping for Flammable and Combustible Liquids—with Revisions through August 2020
Table 5703.6.2

1389—2019: Plant Oil Extraction Equipment for Installation and Use in Ordinary (Unclassified) Locations and Hazardous (Classified) Locations—with Revisions through October 2020
3904.2.1

1489—2016: Fire Tests of Fire Resistant Pipe Protection Systems Carrying Combustible Liquids—with Revisions through October 2021
1203.1.2

1741—2010: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources—with Revisions through June 2021
1207.3.3, 1207.11.5

1778—2014: Uninterruptible Power Systems—with Revisions through October 2017
1207.3.1, 1207.3.7.1, 1207.5.1, 1207.5.3, 1207.5.5, 1207.6.3

1805—2002: Laboratory Hoods and Cabinets—with Revisions through June 2006
3805.2.2

1973—2018: Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications
Table 1207.6

1974—2018: Evaluation for Repurposing Batteries
1207.3.9

1975—2006: Fire Tests for Foamed Plastics Used for Decorative Purpose
807.5.1.1, 808.2

1994—2015: Luminous Egress Path Marking Systems—with Revisions through July 2020
1008.2.1, 1025.2.1, 1025.2.3, 1025.2.4, 1025.2.5, 1025.4

2011—2019: Outline of Investigation for Machinery—with Revisions through October 2020
319.2.1, 319.3.2

2017—2008: General-Purpose Signaling Devices and Systems—with Revisions through December 2016
3905.1.2

2034—2017: Single and Multiple Station Carbon Monoxide Alarms—with Revisions through September 2018
915.4.2, 915.4.3

2075—2013: Gas and Vapor Detectors and Sensors—with Revisions through August 2021
915.5.1, 915.5.3

2079—2015: Tests for Fire Resistance of Building Joint Systems—with Revisions through July 2020
202

2085—1997: Protected Aboveground Tanks for Flammable and Combustible Liquids—with Revisions through September 2010
202, 605.4.1.1, 605.4.2.1, 605.4.2.2, 2306.2.2, 2306.2.3, 5704.2.7.4, 5704.2.9.2.3, 5704.2.9.7.4, 5705.3.8.2

2152—2021: Special Purpose Nonmetallic Containers and Tanks for Specific Combustible or Noncombustible Liquids
607.3

2196—2017: Fire Test for Circuit Integrity of Fire-Resistive Power, Instrumentation, Control and Data Cables—with Revisions through December 2020
913.2.2, 1203.3

2200—2020: Stationary Engine Generator Assemblies
1203.1.1

2201—2018: Standard for Carbon Monoxide (CO) Emission Rate of Portable Generators
1204.2

2208—2010: Solvent Distillation Units—with Revisions through June 2020
5705.4.1

2245—2006: Below-Grade Vaults for Flammable Liquid Storage Tanks
5704.2.8.1

2272—2016: Electrical Systems for Personal E-Mobility Devices
322.3

2335—2010: Fire Tests of Storage Pallets—with Revisions through August 2017
315.7.5, 3206.4.1.1

2360—2000: Test Methods for Determining the Combustibility Characteristics of Plastics Used in Semi-Conductor Tool Construction—with Revisions through October 2017
2703.10.1.2

2524—2019: In-Building 2-Way Emergency Radio Communication Enhancement Systems—with Revisions through February 2019
510.4

2525—2020: Standard for Two-Way Emergency Communications Systems for Rescue Assistance
1009.8.1

2849—2020: Electrical Systems for eBikes
322.3

3741—2020: Standard for Safety for Photovoltaic Hazard Control
1205.2, 1205.2.3

8800—2019: Standard for Horticultural Lighting Equipment And Systems
3901.4

>| | **9540 *Edition 3—2023*: Standard for Energy Storage Systems and Equipment**
1207.3.1, 1207.3.2, 1207.3.7, 1207.10.6, 1207.10.7.4, 1207.11, 1207.11.1, 1207.11.5

9540A *Edition 4*—2019: Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
1207.1.7

60601-1—2003: Medical Electrical Equipment, Part I: General Requirements for Safety—with Revisions through April 2006
603.5.1.1

60950-1—2007: Information Technology Equipment—Safety Requirements—with Revisions through May 2019

319.2.1

62368-1—2019: Audio/video, Information and Communication Technology Equipment—Safety Requirements—with Revisions through October 2021

319.2.1

USC United States Code, c/o Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325

18 USC Part 1, Chapter 40: Importation, Manufacture, Distribution and Storage of Explosive Materials

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21 USC Chapter 9: United States Food, Drug and Cosmetic Act

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX CHAPTER 4
SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]				X																			
Chapter / Section																							
[T-19 §3.26]				X																			

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX CHAPTER

4

SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

SECTION 435—SPECIAL PROVISIONS FOR LICENSED 24-HOUR CARE FACILITIES IN A GROUP R-2.1, R-3.1, R-4 [SFM]

***435.1 Scope**. The provisions of this section shall apply to 24-hour care facilities in a Group R-2.1, R-3.1 or R-4 occupancy licensed by a governmental agency.*

***435.2 General.** The provisions in this section shall apply in addition to general requirements in this code.*

***435.2.1** Restraint shall not be practiced in a Group R-2.1, R-3.1 or R-4 occupancies.*

***Exception:** Occupancies which meet all the requirements for a Group I-3 occupancy.*

***435.2.2** Pursuant to Health and Safety Code, Section 13133, regulations of the state fire marshal pertaining to occupancies classified as Residential Facilities (RF) and Residential-care Facilities for the Elderly (RCFE) shall apply uniformly throughout the state and no city, county, city and county, including a charter city or charter county, or fire protection district shall adopt or enforce any ordinance or local rule or regulation relating to fire and panic safety which is inconsistent with these regulations. A city, county, city and county, including a charter city or charter county may, pursuant to Health and Safety Code, Section 13143.5, or a fire protection district may, pursuant to Health and Safety Code, Section 13869.7, adopt standards more stringent than those adopted by the state fire marshal that are reasonably necessary to accommodate local climate, geological or topographical conditions relating to roof coverings for Residential-care Facilities for the Elderly.*

***Exception:** Local regulations relating to roof coverings in facilities licensed as a Residential Care Facility for the Elderly (RCFE) in accordance with Health and Safety Code Section 13133.*

435.3 Building height and area provisions.

***435.3.1** Group R-2.1, R-3.1 and R-4 shall be constructed in accordance with Table 504.3 of the California Building Code.*

***[California Code of Regulations, Title 19, Division 1, §3.26] Operators Statement – Group I, R-2.1, R-3.1 and R-4 Occupancies.** Every person, firm or corporation maintaining or operating any Group I or R-2.1, R-3.1 or R-4 occupancy shall provide an operators statement in accordance with Section 13132 of the Health and Safety Code which reads as follows:*

*"**13132.** Every person, firm or corporation maintaining or operating any facility for the care of the mentally handicapped shall file a statement with the fire authority having jurisdiction within five days of the admission or readmission of a patient stating that such patient is an ambulatory or a nonambulatory person and enumerating the reasons for such classification. Such a statement shall also be filed for each existing patient within 30 days of the effective date of this section.*

Any statement required to be filed pursuant to this section shall be certified as to its correctness by the person attending such patient.

It shall be unlawful for any person, firm or corporation required to file a statement pursuant to this section to include false statements therein. Any such act shall be in violation of this section and subject to the provisions of Section 13112."

***435.3.2 Limitations six or less clients.** Group R-3.1 occupancies where nonambulatory clients are housed above the first story, having more than two stories in height or having more than 3,000 square feet (279 m^2) of floor area above the first story shall not be of less than 1-hour fire-resistance-rated construction throughout.*

In Group R-3.1 occupancies housing a bedridden client, the client sleeping room shall not be located above or below the first story.

***Exception:** Clients who become bedridden as a result of a temporary illness as defined in Health and Safety Code, Sections 1566.45, 1568.0832, and 1569.72. A temporary illness is an illness which persists for 14 days or less. A bedridden client may be retained in excess of the 14 days upon approval by the Department of Social Services and may continue to be housed on any story in a Group R-3.1 occupancy classified as a licensed residential facility.*

Every licensee admitting or retaining a bedridden resident shall, within 48 hours of the resident's admission or retention in the facility, notify the local fire authority with jurisdiction of the estimated length of time the resident will retain his or her bedridden status in the facility.

***435.3.3 Limitations seven or more clients.** Group R-4 occupancies, where nonambulatory clients are housed above the first story and there is more than 3,000 square feet (279 m^2) of floor area above the first story or housing not more than 16 clients above the first story, shall be constructed of not less than 1-hour fire-resistance-rated construction throughout.*

***435.3.4 Ambulatory and nonambulatory elderly clients.** Group R-4 occupancies housing nonambulatory elderly clients shall be of not less than 1-hour fire-resistance-rated construction throughout.*

435.4 Type of construction provisions.

***435.4.1** Group R-2.1, occupancies are not permitted in non-fire-resistance-rated construction, see Health and Safety Code, Section 13131.5.*

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435.5 Fire-resistance-rated construction provisions.

435.5.1 Smoke barriers required. *Group R-2.1 and R-4 occupancies licensed as a Residential Care Facility (RCF) with individual floor areas over 6000 square feet (557 m^2) per floor, shall be provided with smoke barriers, constructed in accordance with Section 710 of the California Building Code.*

Group R-2.1 occupancies housing bedridden clients shall be provided with smoke barriers constructed in accordance with Section 710 of the California Building Code regardless of the number of clients.

When smoke barriers are required, the area within a smoke compartment shall not exceed 22,500 square feet (2090 m^2) nor shall its travel distance exceed 200 feet (60 960 mm). Such smoke barriers shall divide the floor as equally as possible.

435.5.2 Smoke partitions. *Group R-2.1 occupancies where smoke partitions are required, framing shall be covered with noncombustible materials having an approved thermal barrier with an index of not less than 15 in accordance with FM 4880, UL 1040, NFPA 286 or UL 1715.*

435.5.3 Independent egress. *At least two means of egress shall be provided from each smoke compartment created by smoke barriers. Means of egress may pass through adjacent compartments provided it does not return through the smoke compartment from which means of egress originated.*

435.6 Interior finish provisions.

435.6.1 Interior wall and ceiling finish. *Group R-3.1 occupancies housing a bedridden client shall comply with Interior Wall and Ceiling Finish requirements specified for Group I-2 occupancies in Table 903.3 of the California Building Code.*

435.6.2 Safety padding. *Padding material used on walls, floors and ceilings in Group I and R-2.1 occupancies shall be of an approved type tested in accordance with the procedures established by State Fire Marshal Standard 12-8-100, Room Fire Test for Wall and Ceiling Materials, California Code of Regulations, Title 24, Part 12.*

435.7 Fire Protection system provisions.

435.7.1 Automatic sprinkler systems in Group R-2.1, R-3.1 and R-4 occupancies. *An automatic sprinkler system shall be installed where required in Section 903.*

435.7.2 Fire alarm systems in Group R-2.1 and R-4 occupancies. *An approved fire alarm system shall be installed where required in Section 907.*

435.7.3 Smoke alarms in Groups R-2.1, R-3.1 and R-4 occupancies. *Smoke alarms shall be installed where required in Section 907.2.11.2.*

435.7.4 Hearing impaired. *See Section 907.5.2.3.5.*

435.8 Means of egress provisions.

435.8.1 General. *In addition to the general means of egress requirements of Chapter 10, this section shall apply to Group R-2.1, R-3.1 and R-4 occupancies.*

435.8.2 Number of exits.

435.8.2.1 *Group R-2.1, R-3.1 and R-4 occupancies shall have a minimum of two exits.*

Exception. *Ancillary use areas or occupancies shall have egress as required by Section 1021.*

435.8.3 Egress arrangements.

435.8.3.1 *Egress through adjoining dwelling units shall not be permitted.*

435.8.3.2 Group R-3.1 occupancies housing nonambulatory clients. *In a Group R-3.1 occupancy, bedrooms used by nonambulatory clients shall have access to at least one of the required exits which shall conform to one of the following:*

1. *Egress through a hallway or area into a bedroom in the immediate area which has an exit directly to the exterior and the corridor/hallway is constructed consistent with the dwelling unit interior walls. The hallway shall be separated from common areas by a solid wood door not less than $1^3/_8$ inch (35 mm) in thickness, maintained self-closing or shall be automatic closing by actuation of a smoke detector installed in accordance with Section 716.2.6 of the California Building Code.*
2. *Egress through a hallway which has an exit directly to the exterior. The hallway shall be separated from the rest of the house by a wall constructed consistent with the dwelling unit interior walls and opening protected by a solid wood door not less than $1^3/_8$ inch (35 mm) in thickness, maintained self-closing or shall be automatic closing by actuation of a smoke detector installed in accordance with Section 716.2.6 of the California Building Code.*
3. *Direct exit from the bedroom to the exterior, such doors shall be of a size as to permit the installation of a door not less than 3 feet (914 mm) in width and not less than 6 feet 8 inches (2032 mm) in height. When installed, doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of the exit way is not less than 32 inches (813 mm).*
4. *Egress through an adjoining bedroom which exits to the exterior.*

435.8.3.3 Group R-3.1 occupancies housing only one bedridden client. *In Group R-3.1 occupancies housing a bedridden client and not provided with an approved automatic fire sprinkler system, all of the following shall apply:*

1. *In Group R-3.1 occupancies housing a bedridden client, a direct exit to the exterior of the residence shall be provided from the client sleeping room.*

2. *Doors to a bedridden client's sleeping room shall be of a self-closing, positive latching $1^3/_8$ inch solid wood door. Such doors shall be provided with a gasket so installed as to provide a seal where the door meets the jam on both sides and across the top. Doors shall be maintained self-closing or shall be automatic closing by actuation of a smoke detector in accordance with California Building Code, Section 716.2.6.*
3. *Group R-3.1 occupancies housing a bedridden client shall not have a night latch, dead bolt, security chain or any similar locking device installed on any interior door leading from a bedridden client's sleeping room to any interior area such as a corridor, hallway and/or general use areas of the residence in accordance with Chapter 10.*
4. *The exterior exit door to a bedridden client's sleeping room shall be operable from both the interior and exterior of the residence.*
5. *Every required exit doorway from a bedridden client sleeping room shall be of a size as to permit the installation of a door not less than 3 feet (914 mm) in width and not less than 6 feet 8 inches (2032 mm) in height. When installed in exit doorways, exit doors shall be capable of opening at least 90 degrees and shall be so mounted that the clear width of the exit way is not less than 32 inches (813 mm).*

Note: *A sliding glass door can be used as an exterior exit doorway as long as it is operable from the inside and outside and the clear width of the exit way is not less than 32 inches (813 mm).*

435.8.3.4 Intervening rooms. *A means of exit shall not pass through more than one intervening room. A means of egress shall not pass through kitchens, storerooms, closets, garages or spaces used for similar purposes.*

Exception: *Kitchens which do not form separate rooms by construction.*

435.8.4 Corridors.

435.8.4.1 *Unless specified by Section 435.8.4, corridors serving Group R-2.1 and Group R-4 occupancies shall comply with Section 1020.1.*

435.8.4.2 *The minimum clear width of a corridor shall be as follows:*

1. *Group R-2.1 occupancies shall have 60 inches (1524 mm) on floors housing nonambulatory clients and 44 inches (1118 mm) on floors housing only ambulatory clients.*
2. *Group R-4 occupancies shall have 44 inches (1118 mm) on floors housing clients.*

Exceptions:

1. *Corridors serving an occupant load of 10 or less shall not be less than 36 inches (914 mm) in width.*
2. *Corridors serving ambulatory persons only and having an occupant load of 49 or less shall not be less than 36 inches (914 mm) in width.*

In Group R-2.1 occupancies provided with fire sprinklers throughout and which are required to have rated corridors, door closers need not be installed on doors to client sleeping rooms.

435.8.4.3 *In a Group R-2.1 and Group R-4 occupancies having smoke barriers, cross-corridor doors in corridors 6 feet (1829 mm) or less in width shall have, as a minimum, a door 36 inches (914 mm) in width.*

435.8.5 Changes in level. *In Group R-3.1 occupancies housing nonambulatory clients, interior changes in level up to 0.25 inch (6 mm) may be vertical and without edge treatment. Changes in level between 0.25 inch (6 mm) and 0.5 inch (12.7 mm) shall be beveled with a slope no greater than 1 unit vertical in 2 units horizontal (50-percent slope). Changes in level greater than 0.5 inch (12.7 mm) shall be accomplished by means of a ramp.*

435.8.6 Stairways.

435.8.6.1 *Group R-2.1 and Group R-4 occupancies housing more than six nonambulatory clients above the first floor shall be provided with two vertical exit enclosures. Stairway enclosures shall be in compliance with Section 1023. Exceptions to Section 1023 shall not apply in facilities licensed as a 24-hour care facility.*

435.8.6.2 *Group R-3.1 occupancies may continue to use existing stairways (except for winding and spiral stairways which are not permitted as a required means of egress) provided the stairs have a maximum rise of 8 inches (203 mm) with a minimum run of 9 inches (229 mm). The minimum stairway width may be 30 inches (762 mm).*

435.8.7 Floor separation. *Group R-3.1 occupancies with nonambulatory clients housed above the first floor shall be provided with a non-fire-resistance constructed floor separation at stairs which will prevent smoke migration between floors. Such floor separation shall have equivalent construction of 0.5 inch (12.7 mm) gypsum wallboard on one side of wall framing.*

Exceptions:

1. *Occupancies with at least one exterior exit from floors occupied by clients.*
2. *Occupancies provided with automatic fire sprinkler systems complying with Chapter 9.*

435.8.7.1 Doors within floor separations. *Doors within such floor separations shall be tight fitting solid wood at least $1^3/_8$ inches (35 mm) in thickness. Door glazing shall not exceed 1296 square inches (32 918 mm^2) with no dimension greater than 54 inches (1372 mm). Such doors shall be positive latching, smoke gasketed and shall be automatic-closing by smoke detection.*

435.8.8 Fences and gates. *Grounds of a Residential Care for the Elderly facility serving Alzheimer clients may be fenced and gates therein equipped with locks, provided safe dispersal areas are located not less than 50 feet (15 240 mm) from the buildings. Dispersal areas shall be sized to provide an area of not less than 3 square feet (0.28 m^2) per occupant. Gates shall not be installed across corridors or passageways leading to such dispersal areas unless they comply with egress requirements.*

435.8.9 Basement exits. *One exit is required to grade level when the basement is accessible to clients.*

435.8.10 Delayed egress locks. *See Section 1010.2.13.*

435.9 Request for alternate means of protection for facilities housing bedridden clients*. Request for alternate means of protection shall apply to Sections 435 through 435.9. Request for approval to use an alternative material, assembly or materials, equipment, method of construction, method of installation of equipment or means of protection shall be made in writing to the local fire enforcing agency by the facility, client or the client's authorized representative. Sufficient evidence shall be submitted to substantiate the need for an alternate means of protection.*

The facility, client or the client's representative or the local fire enforcing agency may request a written opinion from the State Fire Marshal concerning the interpretation of the regulations promulgated by the State Fire Marshal for a particular factual dispute. The State Fire Marshal shall issue the written opinion within 45 days following the request.

Approval of a request for use of an alternative material, assembly or materials, equipment, method of construction, method of installation of equipment or means of protection made pursuant to this section shall be limited to Group R-3.1 occupancies housing a bedridden client.

Approvals made by the local fire enforcing agency and the written opinion by the State Fire Marshal shall be applicable only to the requesting facility and shall not be construed as establishing any precedent for any future request by that facility or any other facility.

435.10 Temporarily bedridden clients. *Clients who become temporarily bedridden as defined in Health and Safety Code, Section 1569.72, as enforced by the Department of Social Services, may continue to be housed on any story in Group R-2.1, R-3.1 or R-4 occupancies classified as Residential Care Facilities for the Elderly (RCFE). Every Residential Care Facility for the Elderly (RCFE) admitting or retaining a bedridden resident shall, within 48 hours of the resident's admission or retention in the facility, notify the local fire authority with jurisdiction of the estimated length of time the resident will retain his or her bedridden status in the facility.*

SECTION 436—GROUP I-4 [SFM]

436.1 Group I-4 special provisions. *Rooms classified as Group I-4 shall not be located above or below the first story.*

Exceptions:

1. *Basements or stories having floor levels located within 4 feet (1219 mm), measured vertically, from adjacent ground level at the level of exit discharge, provided the basement or story has exterior exit doors at that level.*
2. *Group I-4 child-care center or adult cay care may be located above the first story in buildings of Types I-A, I-B, II-A, III-A, IV-A, IV-B and IV-C construction, subject to the limitation of Section 503 when:*
    - 2.1. *Group I-4 child-care center with children under the age of seven or containing more than 12 children per story shall not be located above the fourth floor; and*
    - 2.2. *The entire story in which the Group I-4 child-care center or adult day care is located is equipped with an approved manual fire alarm and automatic smoke-detection system. (See the California Fire Code.) Actuation of an initiating device shall sound an audible alarm throughout the entire story. When a building fire alarm system is required by other provisions of this code or the Fire Code, the alarm system shall be connected to the building alarm system. An approved alarm signal shall sound at an approved location in the Group I-4 facility to indicate a fire alarm or sprinkler flow condition in other portions of the building; and*
    - 2.3. *Group I-4 child-care center or adult day care, if more than 1,000 square feet (92.9 m^2) in area, is divided into at least two compartments of approximately the same size by a smoke barrier with door openings protected by smoke- and draft-control assemblies having a fire-protection rating of not less than 20 minutes. Smoke barriers shall have a fire-resistive rating of not less than one hour. In addition to the requirements of Section 508.3.3 of the California Building Code, occupancy separations between Group I-4 child-care center or adult day care and other occupancies shall be constructed as smoke barriers. Door openings in the smoke barrier shall be tightfittinq, with gaskets installed as required by Section 710 of the California Building Code, and shall be automatic closing by actuation of the automatic sprinklers, fire alarm or smoke-detection system.*
    - 2.4. *Each compartment formed by the smoke barrier has not less than two exits or exit access doors, one of which is permitted to pass through the adjoining compartment; and*
    - 2.5. *Where two or more exits or exit access are required, at least one shall not share a common path of travel. The egress system shall comply with the requirements of Section 709 for smoke barriers.*
    - 2.6. *The building is equipped with an automatic sprinkler system throughout.*

436.1.1 Egress. *Rooms used for Group I-4 child-care or adult day care on the first floor shall have one exit door directly to the exterior.*

Exception: *One-hour rated corridors with a minimum width of 60 inches (1524 mm).*

SECTION 452—SCHOOL FACILITIES FOR KINDERGARTEN THROUGH 12TH GRADE AND GROUP E CHILD-CARE

452.1 General provisions*. School facilities for Kindergarten through 12th grade and Group E day care shall comply with the provisions of this section and other applicable provisions of this code including requirements for specific occupancies.*

452.1.1 Location on property. *All buildings housing Group E occupancies shall front directly on a public street or an exit discharge not less than 20 feet (6096 mm) in width. The exit discharge to the public street shall be a minimum 20-foot-wide (6096 mm) right-of-*

way, unobstructed and maintained only as access to the public street. At least one required exit shall be located on the public street or on the exit discharge.

452.1.2 Separate means of egress systems required. *Every room with an occupant load of 300 or more shall have one of its exits or exit-access doorways lead directly into a separate means of egress system that consists of not less than two paths of exit travel which are separated by a smoke barrier in accordance with Section 709 of the California Building Code in such a manner to provide an atmospheric separation that precludes contamination of both paths of exit travel by the same fire. Not more than two required exits or exit-access doorways shall enter into the same means of egress system.*

452.1.3 Fences and gates. *School grounds may be fenced and gates therein may be equipped with locks, provided that safe dispersal areas based on 3 square feet (0.28 m^2) per occupant are located between the school and the fence. Such required safe dispersal areas shall not be located less than 50 feet (15 240 mm) from school buildings.*

Every public and private school shall conform with Section 32020 of the Education Code which states:

The governing board of every public school district, and the governing authority of every private school, which maintains any building used for the instruction or housing of school pupils on land entirely enclosed (except for building walls) by fences of walls, shall, through cooperation with the local law enforcement and fire-protection agencies having jurisdiction of the area, make provision for the erection of gates in such fences or walls. The gates shall be of sufficient size to permit the entrance of the ambulances, police equipment and firefighting apparatus used by the law enforcement and fire-protection agencies. There shall be no less than one such access gate and there shall be as many such gates as needed to assure access to all major buildings and ground areas. If such gates are to be equipped with locks, the locking devices shall be designed to permit ready entrance by the use of the chain or bolt-cutting devices with which the local law enforcement and fire-protection agencies may be equipped.

452.1.4 Special provisions. *Rooms used by kindergarten, first- or second-grade pupils, and Group E child-care, shall not be located above or below the first story.*

Exceptions:

1. *Kindergarten, first- or second-grade pupils, or Group E child-care may be located in basements or stories having floor levels located within 4 feet (1219 mm), measured vertically, from the adjacent ground level at the level of exit discharge, provided the basement or story has exterior exit doors at that level.*
2. *In buildings equipped with an automatic sprinkler system throughout, rooms used for kindergarten, first- and second-grade children or for Group E child-care purposes may be located on the second story, provided there are at least two exterior exit doors, or other egress systems complying with Section 1020 with two exits, for the exclusive use of such occupants. Egress systems for the exclusive use of such occupants shall be maintained until exit discharge at grade is attained.*
3. *Group E day-care facilities may be located above the first story in buildings of Type I-A, Type I-B, Type II-A, III-A, IV-A, IV-B and IV-C construction, subject to the limitation of Section 503 when:*
    - 3.1. *Facilities with children under the age of seven or containing more than 12 children per story shall not be located above the fourth floor; and*
    - 3.2. *The entire story in which the day-care facility is located is equipped with an approved manual fire alarm and automatic smoke-detection system. Actuation of an initiating device shall sound an audible alarm throughout the entire story.*

      When a building fire alarm system is required by other provisions of this code, the alarm system shall be interconnected and sound the day-care fire alarm system; and
    - 3.3. *The day-care facility, if more than 1,000 square feet (92.9 m^2) in area, is divided into at least two compartments of approximately the same size by a smoke barrier in accordance with Section 709 of the California Building Code. In addition to the requirements of Section 508, occupancy separations between daycare and other occupancies shall be constructed as smoke barriers. Door openings in the smoke barrier shall be tight fitting, with gaskets installed as required by Section 716.5.3.1 of the California Building Code and shall be automatic closing by actuation of the fire sprinklers, fire alarm or smoke detection system; and*
    - 3.4. *Each compartment formed by the smoke barrier has not less than two exits or exit-access doors, one of which is permitted to pass through the adjoining compartment, and*
    - 3.5. *At least one exit or exit-access door from the day-care facility shall be into a separate means of egress with not less than two paths of exit travel, which are separated in such a manner to provide an atmospheric separation. The egress system shall comply with the requirements of Section 709 for smoke barriers.*
    - 3.6. *The building is equipped with an automatic sprinkler system throughout.*

452.1.5 Special hazards. *School classrooms constructed after January 1, 1990, not equipped with automatic sprinkler systems, which have metal grilles or bars on all their windows and do not have at least two exit doors within 3 feet (914 mm) of each end of the classroom opening to the exterior of the building or to a common hallway used for evacuation purposes, shall have an inside release for the grilles or bars on at least one window farthest from the exit doors. The window or windows with the inside release shall be clearly marked as emergency exits.*

452.1.6 Class I, II or III-A flammable liquids. *Class I, II or III-A flammable liquids shall not be placed, stored or used in Group E occupancies, except in approved quantities as necessary in laboratories and classrooms and for operation and maintenance as set forth in the California Fire Code.*

SECTION 455—LARGE FAMILY DAY-CARE HOMES [SFM]

455.1 Large family day-care homes.

455.2 *For purposes of clarification, Health and Safety Code Section 1597.45 and 1597.46 is repeated.*

1597.45.

(a) The use of a home as a small or large family day-care home shall be considered a residential use of property and a use by right for the purposes of all local ordinances, including, but not limited to, zoning ordinances.

(b) A local jurisdiction shall not impose a business license, fee or tax for the privilege of operating a small or large family day-care home.

(c) Use of a home as a small or large family day-care home shall not constitute a change of occupancy for purposes of Part 1.5 (commencing with Section 17910) of Division 13 (State Housing Law) or for purposes of local building codes.

(d) A small or large family daycare home shall not be subject to the provisions of Division 13 (commencing with Section 21000) of the Public Resources Code.

(e) The provisions of this chapter do not preclude a city, county or other local public entity from placing restrictions on building heights, setback or lot dimensions of a family day-care home, as long as those restrictions are identical to those applied to all other residences with the same zoning designation as the family day-care home. This chapter does not preclude a local ordinance that deals with health and safety, building standards, environmental impact standards or any other matter within the jurisdiction of a local public entity, as long as the local ordinance is identical to those applied to all other residences with the same zoning designation as the family daycare home. This chapter also does not prohibit or restrict the abatement of nuisances by a city, county, or city and county. However, the ordinance or nuisance abatement shall not distinguish family day-care homes from other homes with the same zoning designation, except as otherwise provided in this chapter.

(f) For purposes of this chapter, "small family day-care home or large family daycare home" includes a detached single-family dwelling, a townhouse, a dwelling unit within a dwelling or a dwelling unit within a covered multifamily dwelling in which the underlying zoning allows for residential uses. A small family daycare home or large family day-care home is where the family day-care provider resides and includes a dwelling or dwelling unit that is rented, leased or owned.

(Amended by Stats. 2019, Ch. 244, Sec. 9. (SB 234) Effective January 1, 2020.)

1597.46.

(a) A large family daycare home shall abide by all standards, in addition to the requirements of the State Uniform Building Standards Code, that are specifically designed to promote fire and life safety in large family day-care homes. The State Fire Marshal shall adopt separate building standards specifically relating to the subject of fire and life safety in family daycare homes, which shall be published in Title 24 of the California Code of Regulations. These standards shall apply uniformly throughout the state and shall include, but not be limited to, all of the following:

(1) The requirement that a large family daycare home contain a fire extinguisher or smoke detector device, or both, that meets child-care standards established by the State Fire Marshal.

(2) Specification as to the number of required exits from the home.

(3) Specification as to the floor or floors on which child-care may be provided and the number of required exits on each floor.

(b) A large family day-care home for children shall have one or more carbon monoxide detectors in the facility that meet the standards established in Chapter 8 (commencing with Section 13260) of Part 2 of Division 12. The department shall account for the presence of these detectors during inspections.

(c) Enforcement of this section shall be in accordance with Sections 13145 and 13146. A city, county, city and county, or district shall not adopt or enforce a building ordinance or local rule or regulation relating to the subject of fire and life safety in large family day-care homes that is inconsistent with those standards adopted by the State Fire Marshal, except to the extent the building ordinance or local rule or regulation applies to all residences with the same zoning designation in which child-care is provided.

(Repealed and added by Stats. 2019, Ch. 244, Sec. 12. (SB 234) Effective January 1, 2020.)

455.3 Smoke alarms. *Large family day-care homes shall be equipped with State Fire Marshal approved and listed single station residential type smoke alarms. The number and placement of smoke alarms shall be determined by the enforcement authority.*

455.4 Fire extinguishers. *Large and small family day-care homes shall be equipped with a portable fire extinguisher having a minimum 2A10BC rating.*

455.5 Fire alarm devices. *See Section 907.2.6.4.*

455.6 Compliance. *Every large-family day-care home shall comply with the provisions for Group R-3 occupancies. For the purposes of Section 436.1 of the California Building Code, the first story shall be designated as the floor used for residential occupancy nearest to the street level which provides primary access to the building.*

455.7 Special hazards. *Every unenclosed gas-fired water heater or furnace which is within the area used for child-care in a large family day-care home shall be protected in such a way as to prevent children from making contact with those appliances.*

Exception: *This does not apply to kitchen stoves or ovens.*

455.8 Exiting. *See Section 1006.2.2.7.*

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX A – BOARD OF APPEALS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

A

BOARD OF APPEALS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:	
About this appendix:	Appendix A contains optional criteria that, when adopted, provide jurisdictions with detailed appeals, board member qualifications and administrative procedures to supplement the basic requirements found in Section 112 of this code.
ICC code development note:	Code change proposals to this appendix will be considered by the Administrative Code Development Committee during the 2025 (Group B) Code Development Cycle.

SECTION A101—GENERAL

A101.1 Scope. A board of appeals shall be established within the jurisdiction for the purpose of hearing applications for modification of the requirements of this code pursuant to the provisions of Section 112. The board shall be established and operated in accordance with this section, and shall be authorized to hear evidence from appellants and the fire code official pertaining to the application and intent of this code for the purpose of issuing orders pursuant to these provisions.

A101.2 Application for appeal. Any person shall have the right to appeal a decision of the fire code official to the board. An application for appeal shall be based on a claim that the intent of this code or the rules legally adopted hereunder have been incorrectly interpreted, the provisions of this code do not fully apply or an equally good or better form of construction is proposed. The application shall be filed on a form obtained from the fire code official within 20 days after the notice was served.

A101.2.1 Limitation of authority. The board shall not have authority to waive requirements of this code or interpret the administration of this code.

A101.2.2 Stays of enforcement. Appeals of notice and orders, other than Imminent Danger notices, shall stay the enforcement of the notice and order until the appeal is heard by the board.

A101.3 Membership of board. The board shall consist of five voting members appointed by the chief appointing authority of the jurisdiction. Each member shall serve for **[NUMBER OF YEARS]** years or until a successor has been appointed. The board member's terms shall be staggered at intervals, so as to provide continuity. The fire code official shall be an ex officio member of said board but shall not vote on any matter before the board.

A101.3.1 Qualifications. The board shall consist of members who are qualified by experience and training to pass on matters pertaining to hazards of fire, explosions, hazardous conditions or fire protection systems, and are not employees of the jurisdiction.

A101.3.2 Alternate members. The chief appointing authority is authorized to appoint two alternate members who shall be called by the board chairperson to hear appeals during the absence or disqualification of a member. Alternate members shall possess the qualifications required for board membership, and shall be appointed for the same term or until a successor has been appointed.

A101.3.3 Vacancies. Vacancies shall be filled for an unexpired term in the same manner in which original appointments are required to be made.

A101.3.4 Chairperson. The board shall annually select one of its members to serve as chairperson.

A101.3.5 Secretary. The chief appointing authority shall designate a qualified clerk to serve as secretary to the board. The secretary shall file a detailed record of all proceedings, which shall set forth the reasons for the board's decision, the vote of each member, the absence of a member and any failure of a member to vote.

A101.3.6 Conflict of interest. A member with any personal, professional or financial interest in a matter before the board shall declare such interest and refrain from participating in discussions, deliberations and voting on such matters.

A101.3.7 Compensation of members. Compensation of members shall be determined by law.

A101.3.8 Removal from the board. A member shall be removed from the board prior to the end of their terms only for cause. Any member with continued absence from regular meetings of the board may be removed at the discretion of the chief appointing authority.

A101.4 Rules and procedures. The board shall establish policies and procedures necessary to carry out its duties consistent with the provisions of this code and applicable state law. The procedures shall not require compliance with strict rules of evidence, but shall mandate that only relevant information be presented.

A101.5 Notice of meetings. The board shall meet upon notice from the chairperson within 10 days of the filing of an appeal or at stated periodic intervals.

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A101.5.1 Open hearing. All hearings before the board shall be open to the public. The appellant, the appellant's representative, the fire code official and any person whose interests are affected shall be given an opportunity to be heard.

A101.5.2 Quorum. Three members of the board shall constitute a quorum.

A101.5.3 Postponed hearing. When five members are not present to hear an appeal, either the appellant or the appellant's representative shall have the right to request a postponement of the hearing.

A101.6 Legal counsel. The jurisdiction shall furnish legal counsel to the board to provide members with general legal advice concerning matters before them for consideration. Members shall be represented by legal counsel at the jurisdiction's expense in all matters arising from service within the scope of their duties.

A101.7 Board decision. The board shall only modify or reverse the decision of the fire code official by a concurring vote of three or more members.

A101.7.1 Resolution. The decision of the board shall be by resolution. Every decision shall be promptly filed in writing in the office of the fire code official within three days and shall be open to the public for inspection. A certified copy shall be furnished to the appellant or the appellant's representative and to the fire code official.

A101.7.2 Administration. The fire code official shall take immediate action in accordance with the decision of the board.

A101.8 Court review. Any person, whether or not a previous party of the appeal, shall have the right to apply to the appropriate court for a writ of certiorari to correct errors of law. Application for review shall be made in the manner and time required by law following the filing of the decision in the office of the chief administrative officer.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX B – FIRE-FLOW REQUIREMENTS FOR BUILDINGS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			X																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
Table B105.1(1)			X																				
B105.2			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

B

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix:	Appendix B provides a tool for the use of jurisdictions in establishing a policy for determining fire-flow requirements in accordance with Section 507.3. The determination of required fire flow is not an exact science, but having some level of information provides a consistent way of choosing the appropriate fire flow for buildings throughout a jurisdiction. The primary tool used in this appendix is a table that presents fire flow based on construction type and building area based on the correlation of the Insurance Services Office (ISO) method and the construction types used in the *California Building Code*.
ICC code development note:	Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION B101—GENERAL

B101.1 Scope. The procedure for determining fire-flow requirements for buildings or portions of buildings hereafter constructed shall be in accordance with this appendix. This appendix does not apply to structures other than buildings.

SECTION B102—DEFINITIONS

B102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIRE FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa) residual pressure, that is available for firefighting.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

SECTION B103—MODIFICATIONS

B103.1 Decreases. The fire code official is authorized to reduce the fire-flow requirements for isolated buildings or a group of buildings in rural areas or small communities where the development of full fire-flow requirements is impractical.

B103.2 Increases. The fire code official is authorized to increase the fire-flow requirements where conditions indicate an unusual susceptibility to group fires or conflagrations. An increase shall be not more than twice that required for the building under consideration.

B103.3 Areas without water supply systems. For information regarding water supplies for firefighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the fire code official is authorized to utilize NFPA 1142 or the *California Wildland-Urban Interface Code*.

SECTION B104—FIRE-FLOW CALCULATION AREA

B104.1 General. The fire-flow calculation area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building.

Exceptions:

1. The fire-flow calculation area of buildings constructed of Types IA and IB construction shall be the area of the three largest successive floors.
2. The fire-flow calculation area for open parking garages of Types IA and IB construction shall be determined by the area of the largest floor.

B104.2 Area separation. Portions of buildings that are separated by fire walls without openings, constructed in accordance with the *California Building Code*, are allowed to be considered as separate fire-flow calculation areas.

SECTION B105—FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum fire-flow and flow duration requirements for one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses shall be as specified in Tables B105.1(1) and B105.1(2).

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TABLE B105.1(1)—REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0–3,600	Section 903.3.1.3 of the *California Fire Code* or Section *309* of the *California Residential Code*	500	$^1/_2$
3,601 and greater	Section 903.3.1.3 of the *California Fire Code* or Section *309* of the *California Residential Code*	$^1/_2$ value in Table B105.1(2)	1

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m.

TABLE B105.1(2)—REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Types IA and IB[a]	Types IIA and IIIA[a]	Types IV and V-A[a]	Types IIB and IIIB[a]	Type V-B[a]		
0–22,700	0–12,700	0–8,200	0–5,900	0–3,600	1,500	2
22,701–30,200	12,701–17,000	8,201–10,900	5,901–7,900	3,601–4,800	1,750	
30,201–38,700	17,001–21,800	10,901–12,900	7,901–9,800	4,801–6,200	2,000	
38,701–48,300	21,801–24,200	12,901–17,400	9,801–12,600	6,201–7,700	2,250	
48,301–59,000	24,201–33,200	17,401–21,300	12,601–15,400	7,701–9,400	2,500	
59,001–70,900	33,201–39,700	21,301–25,500	15,401–18,400	9,401–11,300	2,750	
70,901–83,700	39,701–47,100	25,501–30,100	18,401–21,800	11,301–13,400	3,000	3
83,701–97,700	47,101–54,900	30,101–35,200	21,801–25,900	13,401–15,600	3,250	
97,701–112,700	54,901–63,400	35,201–40,600	25,901–29,300	15,601–18,000	3,500	
112,701–128,700	63,401–72,400	40,601–46,400	29,301–33,500	18,001–20,600	3,750	
128,701–145,900	72,401–82,100	46,401–52,500	33,501–37,900	20,601–23,300	4,000	4
145,901–164,200	82,101–92,400	52,501–59,100	37,901–42,700	23,301–26,300	4,250	
164,201–183,400	92,401–103,100	59,101–66,000	42,701–47,700	26,301–29,300	4,500	
183,401–203,700	103,101–114,600	66,001–73,300	47,701–53,000	29,301–32,600	4,750	
203,701–225,200	114,601–126,700	73,301–81,100	53,001–58,600	32,601–36,000	5,000	
225,201–247,700	126,701–139,400	81,101–89,200	58,601–65,400	36,001–39,600	5,250	
247,701–271,200	139,401–152,600	89,201–97,700	65,401–70,600	39,601–43,400	5,500	
271,201–295,900	152,601–166,500	97,701–106,500	70,601–77,000	43,401–47,400	5,750	
295,901–Greater	166,501–Greater	106,501–115,800	77,001–83,700	47,401–51,500	6,000	
—	—	115,801–125,500	83,701–90,600	51,501–55,700	6,250	
—	—	125,501–135,500	90,601–97,900	55,701–60,200	6,500	
—	—	135,501–145,800	97,901–106,800	60,201–64,800	6,750	
—	—	145,801–156,700	106,801–113,200	64,801–69,600	7,000	
—	—	156,701–167,900	113,201–121,300	69,601–74,600	7,250	
—	—	167,901–179,400	121,301–129,600	74,601–79,800	7,500	
—	—	179,401–191,400	129,601–138,300	79,801–85,100	7,750	
—	—	191,401–Greater	138,301–Greater	85,101–Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *California Building Code*.

b. Measured at 20 psi residual pressure.

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B105.2 Buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses. The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings, Group R-3 and R-4 buildings and townhouses shall be as specified in Tables B105.1(2) and B105.2.

Exception: ***[SFM]*** *Group B, S-2 and U occupancies having a floor area not exceeding 1,000 square feet, primarily constructed of noncombustible exterior walls with wood or steel roof framing, having a Class A roof assembly, with uses limited to the following or similar uses:*

1. *California State Parks buildings of an accessory nature (restrooms).*
2. *Safety roadside rest areas, (SRRA), public restrooms.*
3. *Truck inspection facilities, (TIF), CHP office space and vehicle inspection bays.*
4. *Sand/salt storage buildings, storage of sand and salt.*

TABLE B105.2—REQUIRED FIRE FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *California Fire Code*	25% of the value in Table B105.1(2)[a]	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *California Fire Code*	25% of the value in Table B105.1(2)[b]	Duration in Table B105.1(2) at the reduced flow rate

For SI: 1 gallon per minute = 3.785 L/m.
a. The reduced fire flow shall be not less than 1,000 gallons per minute.
b. The reduced fire flow shall be not less than 1,500 gallons per minute.

B105.3 Water supply for buildings equipped with an automatic sprinkler system. For buildings equipped with an approved automatic sprinkler system, the water supply shall be capable of providing the greater of:

1. The automatic sprinkler system demand, including hose stream allowance.
2. The required fire flow.

SECTION B106—REFERENCED STANDARDS

B106.1 General. See Table B106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE B106.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CBC—25	*California Building Code*	B104.2
CRC—25	*California Residential Code*	Table B105.1(1)
CWUIC—25	*California Wildland-Urban Interface Code*	B103.3
NFPA 1142—22	*Standard on Water Supplies for Suburban and Rural Firefighting*	B103.3

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX BB – FIRE-FLOW REQUIREMENTS FOR BUILDINGS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

BB

FIRE-FLOW REQUIREMENTS FOR BUILDINGS

SECTION BB101—SCOPE

BB101.1 *The procedures determining fire-flow requirements for any school buildings or portions of buildings hereafter constructed for which review and approval is required under Subdivision(a) of Section 17280 of the Government Code shall be in accordance with this appendix as amended by the state fire marshal. This appendix does not apply to structures other than buildings.*

SECTION BB102—DEFINITIONS

BB102.1 *For the purpose of Appendix III-A, certain terms are defined as follows:*

FIRE AREA. *The floor area, in square feet, used to determine the required fire flow.*

FIRE FLOW. *The flow rate of a water supply, measured at 20 psi (137.9 kPa) residual pressure, that is available for firefighting.*

SECTION BB103—MODIFICATIONS

BB103.1 *An alternative method of providing water for fire protection or any other alternative, in lieu of providing the water, may be enforced when deemed appropriate by the fire chief and the state fire marshal.*

SECTION BB104—FIRE AREA

BB104.1 General. *The fire area shall be the total floor area of all floor levels within the exterior walls, and under the horizontal projections of the roof of a building, except as modified in Section 4.*

BB104.2 Area separation. *Portions of buildings which are separated by one or more 4-hour area separation walls constructed in accordance with the building code, without openings and provided with a 30-inch (762 mm) parapet, are allowed to be considered as separate fire areas.*

BB104.3 Type I and Type IB construction. *The fire area of buildings constructed of Type I and Type IB construction shall be the area of the three largest successive floors.*

SECTION BB105—FIRE-FLOW REQUIREMENTS FOR BUILDINGS

BB105.1 *The minimum fire flow and flow duration for school buildings shall be as specified in Table BB105.1.*

Exception: *A reduction in required fire flow of up to 75 percent is allowed when the building is provided with an approved automatic sprinkler system. When a reduction in fire flow is used, fire flow shall not be less than 1500 GPM.*

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TABLE BB105.1—MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS						
FIRE AREA (square feet)					FIRE-FLOW (gallons per minute)b	FLOW DURATION (hours)
Type IA and IB a	Type IIA and IIIA a	Type IV and V-A a	Type IIB and IIIB a	Type V-B a		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI:1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895kPa.
a. Types of construction are based on the *California Building Code.*
b. Measured at 20 psi.

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX C – FIRE HYDRANT LOCATIONS AND DISTRIBUTION

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)			**X**																				
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							
C101.1			X																				
Table C102.1			X																				

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

C

FIRE HYDRANT LOCATIONS AND DISTRIBUTION

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix C focuses on the location and spacing of fire hydrants, which is important to the success of firefighting operations. The difficulty with determining the spacing of fire hydrants is that every situation is unique and has unique challenges. Finding one methodology for determining hydrant spacing is difficult. This particular appendix gives one methodology based on the required fire flow that fire departments can work with to set a policy for hydrant distribution around new buildings and facilities in conjunction with Section 507.5.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION C101—GENERAL

C101.1 Scope. In addition to the requirements of Section 507.5.1, fire hydrants shall be provided in accordance with this appendix for the protection of buildings, or portions of buildings, hereafter constructed or moved into the jurisdiction.

Exception: [SFM] *Group B, S-2 and U occupancies having a floor area not exceeding 1,000 square feet, primarily constructed of noncombustible exterior walls with wood or steel roof framing, having a Class A roof assembly, with uses limited to the following or similar uses:*

1. *California State Parks buildings of an accessory nature (restrooms).*
2. *Safety roadside rest areas, (SRRA), public restrooms.*
3. *Truck inspection facilities, (TIF), California Highway Patrol (CHP) office space and vehicle inspection bays.*
4. *Sand/salt storage buildings, storage of sand and salt.*

SECTION C102—NUMBER OF FIRE HYDRANTS

C102.1 Minimum number of fire hydrants for a building. The number of fire hydrants available to a building shall be not less than the minimum specified in Table C102.1.

TABLE C102.1—REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS[h]

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c, f, g] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d, f, g]
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers that cannot be crossed by firefighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the *California Fire Code*.

g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the *California Fire Code* or Section *R309* of the *California Residential Code*.

h. The fire code official is authorized to modify the location, number and distribution of fire hydrants based on site-specific constraints and hazards.

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SECTION C103—FIRE HYDRANT SPACING

C103.1 Hydrant spacing. Fire apparatus access roads and public streets providing required access to buildings in accordance with Section 503 shall be provided with one or more fire hydrants, as determined by Section C102.1. Where more than one fire hydrant is required, the distance between required fire hydrants shall be in accordance with Sections C103.2 and C103.3.

C103.2 Average spacing. The average spacing between fire hydrants shall be in accordance with Table C102.1.

Exception: The average spacing shall be permitted to be increased by 10 percent where existing fire hydrants provide all or a portion of the required number of fire hydrants.

C103.3 Maximum spacing. The maximum spacing between fire hydrants shall be in accordance with Table C102.1.

SECTION C104—CONSIDERATION OF EXISTING FIRE HYDRANTS

C104.1 Existing fire hydrants. Existing fire hydrants on public streets are allowed to be considered as available to meet the requirements of Sections C102 and C103. Existing fire hydrants on adjacent properties are allowed to be considered as available to meet the requirements of Sections C102 and C103 provided that a fire apparatus access road extends between properties and that an easement is established to prevent obstruction of such roads.

SECTION C105—REFERENCED STANDARD

C105.1 General. See Table C105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE C105.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CRC—25	*California Residential Code*	Table C102.1

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX CC – FIRE HYDRANT LOCATIONS AND DISTRIBUTION

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX
CC

FIRE HYDRANT LOCATIONS AND DISTRIBUTION

SECTION CC101—SCOPE

CC101.1 *Fire hydrants shall be provided in accordance with this appendix for the protection of any school buildings, or portions thereof hereafter constructed for which review and approval are required under Subdivision(a) of Section 17280 of the Government Code.*

SECTION CC102—LOCATION

CC102.1 *Fire hydrants shall be provided along required fire apparatus access roads and adjacent public streets.*

SECTION CC103—NUMBER OF FIRE HYDRANTS

CC103.1 *The minimum number of fire hydrants available to a building shall not be less than that listed in Table CC105.1. The number of fire hydrants available to a complex or subdivision shall not be less than that determined by spacing requirements listed in Table CC105.1 when applied to fire apparatus access roads and perimeter streets from which fire operations could be conducted.*

SECTION CC104—CONSIDERATION OF EXISTING FIRE HYDRANTS

CC104.1 *Existing fire hydrants on public streets are allowed to be considered as available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads.*

SECTION CC105—DISTRIBUTION OF FIRE HYDRANTS

CC105.1 *The average spacing between fire hydrants shall not exceed that listed in Table CC105.1.*

Exception: *A deficiency of up to 10 percent shall not be allowed when existing fire hydrants provide all, or a portion, of the required fire hydrant service.*

Regardless of the average spacing, fire hydrants shall be located such that all points on streets and access roads adjacent to a building are within the distances listed in Table CC105.1.

CC105.2 *When public or private water mains are not available to supply fire flow [not within 1,000 feet (304 800 mm) of the proposed building], the following alternatives shall be used:*

1. *Building(s) shall be protected by an automatic sprinkler system*

   Exception: *Portable (relocatable) buildings, as defined in California Education Code Section 17742.5(e), which requires that portable buildings be designed and constructed to be relocatable over public streets, shall be designed and constructed for relocation without the separation of the roof or floor from the building and when measured at the most exterior walls, shall have a floor area not in excess of 2,000 square feet (186 m^2). Such portable buildings shall be separated from other structures in groupings not to exceed 9,100 square feet (845 m^2) in building area (pursuant to Table 503, California Building Code, for Type V-B buildings). Further area increases shall be as approved by the local fire authority having jurisdiction and the state fire marshal.*

   The water for sprinklers may be supplied by the domestic system, a pressure tank, a gravity tank or other means in accordance with NPFA 13. Water tanks shall be installed in accordance with NFPA 22. (See the California Building Code, Chapter 9.)
2. *When the adequate fire flow is not available and the water for sprinklers is provided from a source other than a public water supply, the amount of water to supply the system shall be calculated using the area/density method or the room design method as delineated in NFPA 13. The calculated duration of water flow to sprinklers shall not be less than 15 minutes to 10 heads.*
3. *The sprinkler system shall have a water flow alarm monitored by an approved central, proprietary or remote station service or a local alarm which will give audible and visual signals at a constant attended location.*
4. *When this alternative is utilized and the calculated water duration to a sprinkler is less than NFPA 13 recommendations, the area increases and fire resistive substitutions allowed in Chapter 5 of the California Building Code shall not be permitted.*

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TABLE CC105.1—NUMBER AND DISTRIBUTION OF FIRE HYDRANTS			
FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d]
1,750 or less	1	500	250
2,000-2,250	2	450	225
2,500	3	450	225
3,000	3	400	225
3,500-4,000	4	350	210
4,500-5,000	5	300	180
5,500	6	300	180
6,000	6	250	150
6,500-7,000	7	250	150
7,500 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers which can be crossed by firefighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis up to a fire-flow requirement of 7,000 gallons per minute and 400 feet for higher fire-flow requirements.

c Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX D – FIRE APPARATUS ACCESS ROADS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

D

FIRE APPARATUS ACCESS ROADS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix:	Appendix D contains more detailed elements for use with the basic access requirements found in Section 503, which gives some minimum criteria, such as a maximum length of 150 feet and a minimum width of 20 feet, but in many cases does not state specific criteria. This appendix, like Appendices B and C, is a tool for jurisdictions looking for guidance in establishing access requirements and includes criteria for multiple-family residential developments, large one- and two-family subdivisions, specific examples for various types of turnarounds for fire department apparatus and parking regulatory signage.
ICC code development note:	Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION D101—GENERAL

D101.1 Scope. Fire apparatus access roads shall be in accordance with this appendix and all other applicable requirements of the *California Fire Code*.

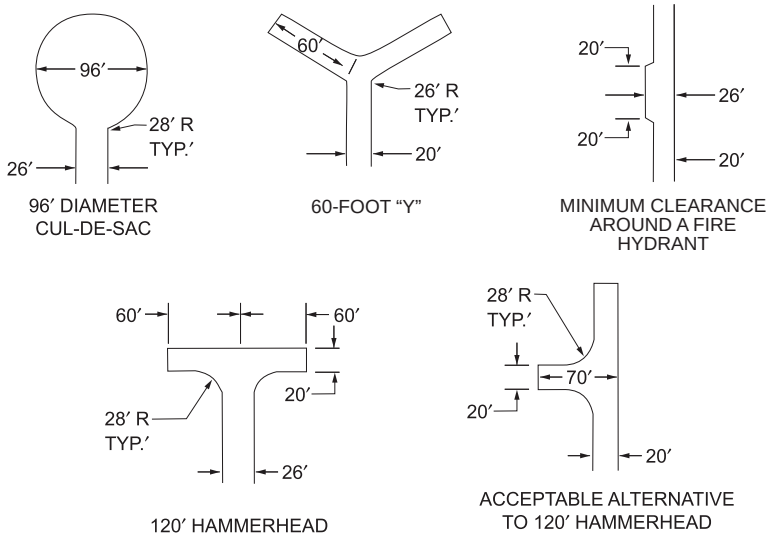
SECTION D102—REQUIRED ACCESS

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

SECTION D103—MINIMUM SPECIFICATIONS

D103.1 Access road width with a hydrant. Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet (7925 mm), exclusive of shoulders (see Figure D103.1).

FIGURE D103.1—DEAD-END FIRE APPARATUS ACCESS ROAD TURNAROUND



For SI: 1 foot = 304.8 mm.

D103.2 Grade. Fire apparatus access roads shall not exceed 10 percent in grade.

Exception: Grades steeper than 10 percent as approved by the fire code official.

D103.3 Turning radius. The minimum turning radius shall be determined by the fire code official.

D103.4 Dead ends. Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with width and turn-around provisions in accordance with Table D103.4.

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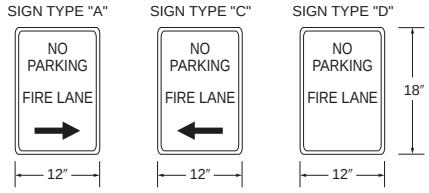
TABLE D103.4—REQUIREMENTS FOR DEAD-END FIRE APPARATUS ACCESS ROADS		
LENGTH (feet)	WIDTH (feet)	TURNAROUNDS REQUIRED
0–150	20	None required
151–500	20	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
501–750	26	120-foot Hammerhead, 60-foot "Y" or 96-foot diameter cul-de-sac in accordance with Figure D103.1
Over 750	Special approval required	
For SI: 1 foot = 304.8 mm.		

D103.5 Fire apparatus access road gates. Gates securing the fire apparatus access roads shall comply with all of the following criteria:

1. Where a single gate is provided, the gate width shall be not less than 20 feet (6096 mm). Where a fire apparatus road consists of a divided roadway, the gate width shall be not less than 12 feet (3658 mm).
2. Gates shall be of the horizontal swing, horizontal slide, vertical lift or vertical pivot type.
3. Construction of gates shall be of materials that allow manual operation by one person.
4. Gate components shall be maintained in an operative condition at all times and replaced or repaired when defective.
5. Electric gates shall be equipped with a means of opening the gate by fire department personnel for emergency access. Emergency opening devices shall be approved by the fire code official.
6. Methods of locking shall be submitted for approval by the fire code official.
7. Electric gate operators, where provided, shall be listed in accordance with UL 325.
8. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

D103.6 Signs. Where required by the fire code official, fire apparatus access roads shall be marked with permanent "NO PARKING—FIRE LANE" signs complying with Figure D103.6. Signs shall have a minimum dimension of 12 inches (305 mm) wide by 18 inches (457 mm) high and have red letters on a white reflective background. Signs shall be posted on one or both sides of the fire apparatus road as required by Section D103.6.1 or D103.6.2.

FIGURE D103.6—FIRE LANE SIGNS



D103.6.1 Roads 20 to 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on both sides of fire apparatus access roads that are 20 to 26 feet wide (6096 to 7925 mm).

D103.6.2 Roads more than 26 feet in width. Fire lane signs as specified in Section D103.6 shall be posted on one side of fire apparatus access roads more than 26 feet wide (7925 mm) and less than 32 feet wide (9754 mm).

SECTION D104—COMMERCIAL AND INDUSTRIAL DEVELOPMENTS

D104.1 Buildings exceeding three stories or 30 feet in height. Buildings or facilities exceeding 30 feet (9144 mm) or three stories in height shall have not fewer than two means of fire apparatus access for each structure.

D104.2 Buildings exceeding 62,000 square feet in area. Buildings or facilities having a gross building area of more than 62,000 square feet (5760 m^2) shall be provided with two separate and approved fire apparatus access roads.

Exception: Projects having a gross building area of up to 124,000 square feet (11 520 m^2) that have a single approved fire apparatus access road where all buildings are equipped throughout with approved automatic sprinkler systems.

D104.3 Remoteness. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.

SECTION D105—AERIAL FIRE APPARATUS ACCESS ROADS

D105.1 Where required. Where the vertical distance between the grade plane and the highest roof surface exceeds 30 feet (9144 mm), approved aerial fire apparatus access roads shall be provided. For purposes of this section, the highest roof surface shall be

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determined by measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of parapet walls, whichever is greater.

Exception: Where approved by the fire code official, buildings of Type IA, Type IB or Type IIA construction equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and having firefighter access through an enclosed stairway with a Class I standpipe from the lowest level of fire department vehicle access to all roof surfaces.

D105.2 Width. Aerial fire apparatus access roads shall have a minimum unobstructed width of 26 feet (7925 mm), exclusive of shoulders, in the immediate vicinity of the building or portion thereof.

D105.3 Proximity to building. One or more of the required access routes meeting this condition shall be located not less than 15 feet (4572 mm) and not greater than 30 feet (9144 mm) from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial fire apparatus access road is positioned shall be approved by the fire code official.

D105.4 Obstructions. Overhead utility and power lines shall not be located over the aerial fire apparatus access road or between the aerial fire apparatus road and the building. Other obstructions shall be permitted to be placed with the approval of the fire code official.

SECTION D106—MULTIPLE-FAMILY RESIDENTIAL DEVELOPMENTS

D106.1 Projects having more than 100 dwelling units. Multiple-family residential projects having more than 100 dwelling units shall be equipped throughout with two separate and approved fire apparatus access roads.

Exception: Projects having up to 200 dwelling units shall have not fewer than one approved fire apparatus access road where all buildings, including nonresidential occupancies, are equipped throughout with approved automatic sprinkler systems installed in accordance with Section 903.3.1.1 or 903.3.1.2.

D106.2 Projects having more than 200 dwelling units. Multiple-family residential projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus access roads regardless of whether they are equipped with an approved automatic sprinkler system.

D106.3 Remoteness. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

SECTION D107—ONE- OR TWO-FAMILY RESIDENTIAL DEVELOPMENTS

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads.

Exceptions:

1. Where there are more than 30 dwelling units accessed from a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
2. The number of dwelling units accessed from a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

D107.2 Remoteness. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one-half of the length of the maximum overall diagonal dimension of the property or area to be served, measured in a straight line between accesses.

SECTION D108—REFERENCED STANDARDS

D108.1 General. See Table D108.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE D108.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F2200—14	*Standard Specification for Automated Vehicular Gate Construction*	D103.5
UL 325—02	*Door, Drapery, Gate, Louver, and Window Operators and Systems*, with Revisions through May 2015	D103.5

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX E – HAZARD CATEGORIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

E

HAZARD CATEGORIES

This appendix is for information purposes and is not intended for adoption.

User notes:

About this appendix: Appendix E contains guidance for designers, engineers, architects, code officials, plans reviewers and inspectors in the classifying of hazardous materials so that proposed designs can be evaluated intelligently and accurately. The descriptive materials and explanations of hazardous materials and how to report and evaluate them on a Safety Data Sheet (SDS) are intended to be instructional as well as informative. This appendix also provides a comparative tool to better understand how the classifications in the International Codes (I-Codes) relate to the UN Recommendations on the Transport of Dangerous Goods, Model Regulations and UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION E101—GENERAL

E101.1 Scope. This appendix provides information, explanations and examples to illustrate and clarify the hazard categories contained in Chapter 50 of the *California Fire Code*. The hazard categories are based on the DOL 29 CFR. Where numerical classifications are included, they are in accordance with nationally recognized standards.

This appendix should not be used as the sole means of hazardous materials classification.

SECTION E102—HAZARD CATEGORIES

E102.1 Physical hazards. Materials classified in this section pose a physical hazard.

E102.1.1 Explosives and blasting agents. The current UN/DOT classification system recognized by international authorities, the Department of Defense and others classifies all explosives as Class 1 materials. They are then divided into six separate divisions to indicate their relative hazard. There is not a direct correlation between the designations used by the old DOT system and those used by the current system nor is there correlation with the system (high and low) established by the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATF). Table 5604.3 provides some guidance with regard to the current categories and their relationship to the old categories. Some items appear in more than one division, depending on factors such as the degree of confinement or separation, by type of packaging, storage configuration or state of assembly.

In order to determine the level of hazard presented by explosive materials, testing to establish quantitatively their explosive nature is required. There are numerous test methods that have been used to establish the character of an explosive material. Standardized tests, required for finished goods containing explosives or explosive materials in a packaged form suitable for shipment or storage, have been established by UN/DOT and BATF. However, these tests do not consider key elements that should be examined in a manufacturing situation. In manufacturing operations, the condition and/or the state of a material may vary within the process. Potentially, material classification and the requirements used to determine that classification during manufacturing will differ from the classification of the same material found in finished goods. A classification methodology must be used that recognizes the hazards commensurate with the application to the variable physical conditions as well as potential variations of physical character and type of explosive under consideration.

Test methods or guidelines for hazard classification of energetic materials used for in-process operations shall be approved by the fire code official. Test methods used shall be DOD, BATF, UN/DOT or other approved criteria. The results of such testing shall become a portion of the files of the jurisdiction and be included as an independent section of any Hazardous Materials Management Plan (HMMP) required by Section 5605.2.1. Also see Section 104.2.2.

Examples of materials in various Divisions are as follows:

1. Division 1.1 (High Explosives). Consists of explosives that have a mass explosion hazard. A mass explosion is one that affects almost the entire pile of material instantaneously. Includes substances that, where tested in accordance with approved methods, can be caused to detonate by means of a blasting cap where unconfined or will transition from deflagration to a detonation where confined or unconfined. Examples: dynamite, TNT, nitroglycerine, C-3, HMX, RDX, encased explosives, military ammunition.
2. Division 1.2 (Low Explosives). Consists of explosives that have a projection hazard, but not a mass explosion hazard. Examples: nondetonating encased explosives, military ammunition and the like.
3. Division 1.3 (Low Explosives). Consists of explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard. The major hazard is radiant heat or violent burning, or both. Can be deflagrated where confined. Examples: smokeless powder, propellant explosives, display fireworks.
4. Division 1.4. Consists of explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is expected. An internal fire must not cause virtually instantaneous explosion of almost the entire contents of the package. Examples: squibs (nondetonating igniters), explosive actuators, explosive trains (low-level detonating cord).

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5. Division 1.5 (Blasting Agents). Consists of very insensitive explosives. This division comprises substances that have a mass explosion hazard, but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport. Materials are not cap sensitive; however, they are mass detonating where provided with sufficient input. Examples: oxidizer and liquid fuel slurry mixtures and gels, ammonium nitrate combined with fuel oil.
6. Division 1.6. Consists of extremely insensitive articles that do not have a mass explosive hazard. This division comprises articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation. Although this category of materials has been defined, the primary application is currently limited to military uses. Examples: Low vulnerability military weapons.

Explosives in each division are assigned a compatibility group letter by the Associate Administrator for Hazardous Materials Safety (DOT) based on criteria specified by DOTn 49 CFR. Compatibility group letters are used to specify the controls for the transportation and storage related to various materials to prevent an increase in hazard that might result if certain types of explosives were stored or transported together. Altogether, there are 35 possible classification codes for explosives, for example, 1.1A, 1.3C, 1.4S.

E102.1.2 Compressed gases. Examples include:

1. Flammable: acetylene, carbon monoxide, ethane, ethylene, hydrogen, methane. Ammonia will ignite and burn although its flammable range is too narrow for it to fit the definition of "Flammable gas."

For binary mixtures where the hazardous component is diluted with a nonflammable gas, the mixture shall be categorized in accordance with CGA P-23.

2. Oxidizing: oxygen, ozone, oxides of nitrogen, chlorine and fluorine. Chlorine and fluorine do not contain oxygen but reaction with flammables is similar to that of oxygen.
3. Corrosive: ammonia, hydrogen chloride, fluorine.
4. Highly toxic: arsine, cyanogen, fluorine, germane, hydrogen cyanide, nitric oxide, phosphine, hydrogen selenide, stibine.
5. Toxic: chlorine, hydrogen fluoride, hydrogen sulfide, phosgene, silicon tetrafluoride.
6. Inert (chemically unreactive): argon, helium, krypton, neon, nitrogen, xenon.
7. Pyrophoric: diborane, dichloroborane, phosphine, silane.
8. Unstable (reactive): butadiene (unstabilized), ethylene oxide, vinyl chloride.

E102.1.3 Flammable and combustible liquids. Examples include:

1. Flammable liquids.

   Class IA liquids shall include those having flash points below 73°F (23°C) and having a boiling point at or below 100°F (38°C).

   Class IB liquids shall include those having flash points below 73°F (23°C) and having a boiling point at or above 100°F (38°C).

   Class IC liquids shall include those having flash points at or above 73°F (23°C) and below 100°F (38°C).
2. Combustible liquids.

   Class II liquids shall include those having flash points at or above 100°F (38°C) and below 140°F (60°C).

   Class IIIA liquids shall include those having flash points at or above 140°F (60°C) and below 200°F (93°C).

   Class IIIB liquids shall include those liquids having flash points at or above 200°F (93°C).

E102.1.4 Flammable solids. Examples include:

1. Organic solids: camphor, cellulose nitrate, naphthalene.
2. Inorganic solids: decaborane, lithium amide, phosphorous heptasulfide, phosphorous sesquisulfide, potassium sulfide, anhydrous sodium sulfide, sulfur.
3. Combustible metals (except dusts and powders): cesium, magnesium, zirconium.

E102.1.5 Combustible dusts and powders. Finely divided solids that could be dispersed in air as a dust cloud: wood sawdust, plastics, coal, flour, powdered metals (few exceptions).

E102.1.6 Combustible fibers. See the definition of combustible fibers in Section 202.

E102.1.7 Oxidizers. Examples include:

1. Gases: oxygen, ozone, oxides of nitrogen, fluorine and chlorine (reaction with flammables is similar to that of oxygen).
2. Liquids: bromine, hydrogen peroxide, nitric acid, perchloric acid, sulfuric acid.
3. Solids: chlorates, chromates, chromic acid, iodine, nitrates, nitrites, perchlorates, peroxides.

E102.1.7.1 Examples of liquid and solid oxidizers according to hazard. Examples include:

Class 4: ammonium perchlorate (particle size greater than 15 microns), ammonium permanganate, guanidine nitrate, hydrogen peroxide solutions more than 91 percent by weight, perchloric acid solutions more than 72.5 percent by weight, potassium superoxide, tetranitromethane.

Class 3: ammonium dichromate, calcium hypochlorite (over 50 percent by weight), chloric acid (10 percent maximum concentration), hydrogen peroxide solutions (greater than 52 percent up to 91 percent), mono-(trichloro)-tetra-(monopotassium dichloro)-penta-s-triazinetrione, nitric acid, (fuming—more than 86 percent concentration), perchloric acid solutions (60

percent to 72 percent by weight), potassium bromate, potassium chlorate, potassium dichloro-s-triazinetrione (potassium dichloro-isocyanurate), potassium perchlorate (99 percent), potassium permanganate (greater than 97.5 percent), sodium bromate, sodium chlorate and sodium chlorite (over 40 percent by weight).

Class 2: barium bromate, barium chlorate, barium hypochlorite, barium perchlorate, barium permanganate, 1-bromo-3-chloro-5, 5-dimethylhydantoin, calcium chlorate, calcium chlorite, calcium hypochlorite (50 percent or less by weight), calcium perchlorate, calcium permanganate, calcium peroxide (75 percent), chromium trioxide (chromic acid), copper chlorate, halane (1, 3-dichloro-5, 5-dimethylhydantoin), hydrogen peroxide (greater than 27.5 percent up to 52 percent), lead perchlorate, lithium chlorate, lithium hypochlorite (more than 39 percent available chlorine), lithium perchlorate, magnesium bromate, magnesium chlorate, magnesium perchlorate, mercurous chlorate, nitric acid (more than 40 percent but less than 86 percent), perchloric acid solutions (more than 50 percent but less than 60 percent), potassium peroxide, potassium superoxide, silver peroxide, sodium chlorite (40 percent or less by weight), sodium dichloro-s-triazinetrione anhydrous (sodium dichloroisocyanurate anhydrous), sodium perchlorate, sodium perchlorate monohydrate, sodium permanganate, sodium peroxide, sodium persulfate (99 percent), strontium chlorate, strontium perchlorate, thallium chlorate, urea hydrogen peroxide, zinc bromate, zinc chlorate and zinc permanganate.

Class 1: all inorganic nitrates (unless otherwise classified), all inorganic nitrites (unless otherwise classified), ammonium persulfate, barium peroxide, hydrogen peroxide solutions (greater than 8 percent up to 27.5 percent), lead dioxide, lithium hypochlorite (39 percent or less available chlorine), lithium peroxide, magnesium peroxide, manganese dioxide, nitric acid (40 percent concentration or less), perchloric acid solutions (less than 50 percent by weight), potassium dichromate, potassium monopersulfate (45 percent $KHSO_5$ or 90 percent triple salt), potassium percarbonate, potassium persulfate, sodium carbonate peroxide, sodium dichloro-s-triazinetrione dihydrate, sodium dichromate, sodium perborate (anhydrous), sodium perborate monohydrate, sodium perborate tetra-hydrate, sodium percarbonate, strontium peroxide, trichloro-s-triazinetrione (trichloroisocyanuric acid) and zinc peroxide.

E102.1.7.2 Oxidizer classification. The UN's *Globally Harmonized System (GHS)* is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials. Federal law (DOL 29 CFR 1910.1200 and DOTn 49 CFR 173.127) mandate that manufacturers selling, producing or transporting chemicals in the United States classify chemicals according to the GHS system and make the classifications available in product Safety Data Sheets. For the classification of solid and liquid oxidizers, GHS relies on relevant quantitative test data that measures burning rate, a key indicator of the severity of the hazard. To assist code officials, an alignment between the GHS and *CFC* oxidizer hazard classes is provided in Table E102.1.7.2. This alignment is provided as a tool to assist fire code officials and should not be used as the sole means for hazardous materials classification.

TABLE E102.1.7.2—OXIDIZER COMPARISON (*CFC* VERSUS GHS)

CFC HAZARD CLASSIFICATION	GHS HAZARD CLASSIFICATION
Oxidizer, Class 4	H271, Category 1
Oxidizer, Class 3	H271, Category 1
Oxidizer, Class 2	H272, Category 2
Oxidizer, Class 1	H272, Category 3

E102.1.8 Organic peroxides. Organic peroxides contain the double oxygen or peroxy (-o-o) group. Some are flammable compounds and subject to explosive decomposition. They are available as:

1. Liquids.
2. Pastes.
3. Solids (usually finely divided powders).

E102.1.8.1 Classification of organic peroxides according to hazard. Examples include:

Unclassified: Unclassified organic peroxides are capable of detonation and are regulated in accordance with Chapter 56.

Class I: acetyl cyclohexane sulfonyl 60-65 percent concentration by weight, fulfonyl peroxide, benzoyl peroxide over 98 percent concentration, t-butyl hydroperoxide 90 percent, t-butyl peroxyacetate 75 percent, t-butyl peroxyisopropylcarbonate 92 percent, diisopropyl peroxydicarbonate 100 percent, di-n-propyl peroxydicarbonate 98 percent, and di-n-propyl peroxydicarbonate 85 percent.

Class II: acetyl peroxide 25 percent, t-butyl hydroperoxide 70 percent (with DTBP and t-BuOH diluents), t-butyl peroxybenzoate 98 percent, t-butyl peroxy-2-ethylhexanoate 97 percent, t-butyl peroxyisobutyrate 75 percent, t-butyl peroxyisopropyl-carbonate 75 percent, t-butyl peroxypivalate 75 percent, dybenzoyl peroxydicarbonate 85 percent, di-sec-butyl peroxydicarbonate 98 percent, di-secbutyl peroxydicarbonate 75 percent, 1,1-di-(t-butylperoxy)-3,5,5-trimethyecyclohexane 95 percent, di-(2-ethythexyl) peroxydicarbonate 97 percent, 2,5-dymethyl-2-5 di (benzoylperoxy) hexane 92 percent, and peroxyacetic acid 43 percent.

Class III: acetyl cyclohexane sulfonal peroxide 29 percent, benzoyl peroxide 78 percent, benzoyl peroxide paste 55 percent, benzoyl peroxide paste 50 percent peroxide/50 percent butylbenzylphthalate diluent, cumene hydroperoxide 86 percent, di-(4-butylcyclohexyl) peroxydicarbonate 98 percent, t-butyl peroxy-2-ethylhexanoate 97 percent, t-butyl peroxyneodecanoate 75 percent, decanoyl peroxide 98.5 percent, di-t-butyl peroxide 99 percent, 1,1-di-(t-butylperoxy)3,5,5-trimethylcyclohexane

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75 percent, 2,4-dichlorobenzoyl peroxide 50 percent, di-isopropyl peroxydicarbonate 30 percent, 2,-5-di-methyl-2,5-di-(2-ethylhexanolyperoxy)-hexane 90 percent, 2,5-dimethyl-2,5-di-(t-butylperoxy) hexane 90 percent and methyl ethyl ketone peroxide 9 percent active oxygen diluted in dimethyl phthalate.

Class IV: benzoyl peroxide 70 percent, benzoyl peroxide paste 50 percent peroxide/15 percent water/35 percent butylphthalate diluent, benzoyl peroxide slurry 40 percent, benzoyl peroxide powder 35 percent, t-butyl hydroperoxide 70 percent, (with water diluent), t-butyl peroxy-2-ethylhexanoate 50 percent, decumyl peroxide 98 percent, di-(2-ethylhexal) peroxydicarbonate 40 percent, laurel peroxide 98 percent, p-methane hydroperoxide 52.5 percent, methyl ethyl ketone peroxide 5.5 percent active oxygen and methyl ethyl ketone peroxide 9 percent active oxygen diluted in water and glycols.

Class V: benzoyl peroxide 35 percent, 1,1-di-t-butyl peroxy 3,5,5-trimethylcyclohexane 40 percent, 2,5-di-(t-butyl peroxy) hexane 47 percent and 2,4-pentanedione peroxide 4 percent active oxygen.

E102.1.9 Pyrophoric materials. Examples include:

1. Gases: diborane, phosphine, silane.
2. Liquids: diethylaluminum chloride, di-ethylberyllium, diethylphosphine, diethylzinc, dimethylarsine, triethylaluminum etherate, tri-ethylbismuthine, triethylboron, trimethylaluminum, trimethylgallium.
3. Solids: cesium, hafnium, lithium, white or yellow phosphorous, plutonium, potassium, rubidium, sodium, thorium.

E102.1.10 Unstable (reactive) materials. Examples include:

Class 4: acetyl peroxide, dibutyl peroxide, dinitrobenzene, ethyl nitrate, peroxyacetic acid and picric acid (dry) trinitrobenzene.

Class 3: hydrogen peroxide (greater than 52 percent), hydroxylamine, nitromethane, paranitroaniline, perchloric acid and tetrafluoroethylene monomer.

Class 2: acrolein, acrylic acid, hydrazine, methacrylic acid, sodium perchlorate, styrene and vinyl acetate.

Class 1: acetic acid, hydrogen peroxide 35 percent to 52 percent, paraldehyde and tetrahydrofuran.

E102.1.11 Water-reactive materials. Examples include:

Class 3: aluminum alkyls such as triethylaluminum, isobutylaluminum and trimethylaluminum; bromine pentafluoride, bromine trifluoride, chlorodiethylaluminium and diethylzinc.

Class 2: calcium carbide, calcium metal, cyanogen bromide, lithium hydride, methyldichlorosilane, potassium metal, potassium peroxide, sodium metal, sodium peroxide, sulfuric acid and trichlorosilane.

Class 1: acetic anhydride, sodium hydroxide, sulfur monochloride and titanium tetrachloride.

E102.1.12 Cryogenic fluids. The cryogenics listed will exist as compressed gases where they are stored at ambient temperatures.

1. Flammable: carbon monoxide, deuterium (heavy hydrogen), ethylene, hydrogen, methane.
2. Oxidizing: fluorine, nitric oxide, oxygen.
3. Corrosive: fluorine, nitric oxide.
4. Inert (chemically unreactive): argon, helium, krypton, neon, nitrogen, xenon.
5. Highly toxic: fluorine, nitric oxide.

E102.2 Health hazards. Materials classified in this section pose a health hazard.

E102.2.1 Highly toxic materials. Examples include:

1. Gases: arsine, cyanogen, diborane, fluorine, germane, hydrogen cyanide, nitric oxide, nitrogen dioxide, ozone, phosphine, hydrogen selenide, stibine.
2. Liquids: acrolein, acrylic acid, 2-chloroethanol (ethylene chlorohydrin), hydrazine, hydrocyanic acid, 2-methylaziridine (propylenimine), 2-methyl-acetonitrile (acetone cyanohydrin), methyl ester isocyanic acid (methyl isocyanate), nicotine, tetranitromethane and tetraethylstannane (tetraethyltin).
3. Solids: (aceto) phenylmercury (phenyl mercuric acetate), 4-aminopyridine, arsenic pentoxide, arsenic trioxide, calcium cyanide, 2-chloroacetophenone, aflatoxin B, decaborane(14), mercury (II) bromide (mercuric bromide), mercury (II) chloride (corrosive mercury chloride), pentachlorophenol, methyl parathion, phosphorus (white) and sodium azide.

E102.2.2 Toxic materials. Examples include:

1. Gases: boron trichloride, boron trifluoride, chlorine, chlorine trifluoride, hydrogen fluoride, hydrogen sulfide, phosgene, silicon tetrafluoride.
2. Liquids: acrylonitrile, allyl alcohol, alpha-chlorotoluene, aniline, 1-chloro-2,3-epoxypropane, chloroformic acid (allyl ester), 3-chloropropene (allyl chloride), o-cresol, crotonaldehyde, dibromomethane, diisopropylamine, diethyl ester sulfuric acid, dimethyl ester sulfuric acid, 2-furaldehyde (furfural), furfural alcohol, phosphorus chloride, phosphoryl chloride (phosphorus oxychloride) and thionyl chloride.
3. Solids: acrylamide, barium chloride, barium (II) nitrate, benzidine, p-benzoquinone, beryllium chloride, cadmium chloride, cadmium oxide, chloroacetic acid, chlorophenylmercury (phenyl mercuric chloride), chromium (VI) oxide (chromic acid, solid), 2,4-dinitrotoluene, hydroquinone, mercury chloride (calomel), mercury (II) sulfate (mercuric sulfate), osmium tetroxide, oxalic acid, phenol, P-phenylenediamine, phenylhydrazine, 4-phenylmorpholine, phosphorus sulfide, potassium fluoride, potassium hydroxide, selenium (IV) disulfide and sodium fluoride.

E102.2.3 Corrosives. Examples include:

1. Acids: Examples: chromic, formic, hydrochloric (muriatic) greater than 15 percent, hydrofluoric, nitric (greater than 6 percent, perchloric, sulfuric (4 percent or more).
2. Bases (alkalis): hydroxides-ammonium (greater than 10 percent), calcium, potassium (greater than 1 percent), sodium (greater than 1 percent); certain carbonates-potassium.
3. Other corrosives: bromine, chlorine, fluorine, iodine, ammonia.

Note: Corrosives that are oxidizers (for example, nitric acid, chlorine, fluorine), compressed gases (for example, ammonia, chlorine, fluorine), or water-reactive (for example, concentrated sulfuric acid, sodium hydroxide) are physical hazards in addition to being health hazards.

SECTION E103—EVALUATION OF HAZARDS

E103.1 Degree of hazard. The degree of hazard present depends on many variables that should be considered individually and in combination. Some of these variables are as shown in Sections E103.1.1 through E103.1.5.

E103.1.1 Chemical properties of the material. Chemical properties of the material determine self reactions and reactions that could occur with other materials. Generally, materials within subdivisions of hazard categories will exhibit similar chemical properties. However, materials with similar chemical properties could pose very different hazards. Each individual material should be researched to determine its hazardous properties and then considered in relation to other materials that it might contact and the surrounding environment.

E103.1.2 Physical properties of the material. Physical properties, such as whether a material is a solid, liquid or gas at ordinary temperatures and pressures, considered along with chemical properties will determine requirements for containment of the material. Specific gravity (weight of a liquid compared to water) and vapor density (weight of a gas compared to air) are both physical properties that are important in evaluating the hazards of a material.

E103.1.3 Amount and concentration of the material. The amount of material present and its concentration must be considered along with physical and chemical properties to determine the magnitude of the hazard. Hydrogen peroxide, for example, is used as an antiseptic and a hair bleach in low concentrations (approximately 8 percent in water solution). Over 8 percent, hydrogen peroxide is classed as an oxidizer and is toxic. Above 90 percent, it is a Class 4 oxidizer "that can undergo an explosive reaction when catalyzed or exposed to heat, shock or friction," a definition that, incidentally, places hydrogen peroxide over 90-percent concentration in the unstable (reactive) category. Small amounts at high concentrations could present a greater hazard than large amounts at low concentrations.

E103.1.3.1 Mixtures. Gases—toxic and highly toxic gases include those gases that have an LC_{50} of 2,000 parts per million (ppm) or less when rats are exposed for a period of 1 hour or less. To maintain consistency with the definitions for these materials, exposure data for periods other than 1 hour must be normalized to 1 hour. To classify mixtures of *compressed gases* that contain one or more toxic or highly toxic components, the LC_{50} of the mixture must be determined. Mixtures that contain only two components are binary mixtures. Those that contain more than two components are multicomponent mixtures. Where two or more hazardous substances (components) having an LC_{50} below 2,000 ppm are present in a mixture, their combined effect, rather than that of the individual substance components, must be considered. The effects of the hazards present must be considered as additive, except where there is a good reason to believe that the principal effects of the different harmful substances (components) are not additive.

For binary mixtures where the hazardous component is diluted with a nontoxic gas such as an inert gas, the LC_{50} of the mixture is estimated by use of the methodology contained in CGA P-20. The hazard zones specified in CGA P-20 are applicable for DOTn purposes and shall not be used for hazard classification.

E103.1.4 Actual use, activity or process involving the material. The definition of handling, storage and use in closed systems refers to materials in packages or containers. Dispensing and use in open containers or systems describes situations where a material is exposed to ambient conditions or vapors are liberated to the atmosphere. Dispensing and use in open systems, then, are generally more hazardous situations than handling, storage or use in closed systems. The actual use or process could include heating, electric or other sparks, catalytic or reactive materials and many other factors that could affect the hazard and must therefore be thoroughly analyzed.

E103.1.5 Surrounding conditions. Conditions such as other materials or processes in the area, type of construction of the structure, fire protection features (for example, fire walls, automatic sprinkler systems, alarms), occupancy (use) of adjoining areas, normal temperatures, exposure to weather, etc., must be taken into account in evaluating the hazard.

E103.2 Evaluation questions. The following are sample evaluation questions:

1. What is the material? Correct identification is important; exact spelling is vital. Checking labels and SDS and asking responsible persons should be among the highest priorities.
2. What are the concentration and strength?
3. What is the physical form of the material? Liquids, gases and finely divided solids have differing requirements for spill and leak control and containment.
4. How much material is present? Consider in relation to permit amounts, maximum allowable quantity per control area (from Group H occupancy requirements), amounts that require detached storage and overall magnitude of the hazard.

5. What other materials (including furniture, equipment and building components) are close enough to interact with the material?
6. What are the likely reactions?
7. What is the activity involving the material?
8. How does the activity impact the hazardous characteristics of the material? Consider vapors released or hazards otherwise exposed.
9. What must the material be protected from? (For example, other materials, temperature, shock, pressure.)
10. What effects of the material must people and the environment be protected from?
11. How can protection be accomplished? Consider:
    - 11.1. Proper containers and equipment.
    - 11.2. Separation by distance or construction.
    - 11.3. Enclosure in cabinets or rooms.
    - 11.4. Spill control, drainage and containment.
    - 11.5. Control system ventilation, special electrical, detection and alarm, extinguishment, explosion venting, limit controls, exhaust scrubbers and excess flow control.
    - 11.6. Administrative (operational) control signs, ignition source control, security, personnel training, established procedures, storage plans and emergency plans.

Evaluation of the hazard is a strongly subjective process; therefore, the person charged with this responsibility must gather as much relevant data as possible so that the decision will be objective and within the limits prescribed in laws, policies and standards.

It could be necessary to cause the responsible persons in charge to have tests made by qualified persons or testing laboratories to support contentions that a particular material or process is or is not hazardous. See Section 104.2.2

SECTION E104—GHS HAZARDOUS MATERIALS DEFINITIONS

E104.1 Hazardous materials definitions. The categorization and classification of hazardous materials enables the code user to determine the applicability of requirements based on hazard category and class related to the physical and health hazards of materials. The current definitions found in Chapter 2 have been developed using criteria found in NFPA codes and standards, model fire prevention codes, NIOSH, and requirements of the US Department of Transporation (DOTn 49 CFR)and US Department of Labor (DOL 49 CFR 1910).

The chemical industry has grown substantially since the inception of the *CFC* hazard definitions. Large-scale global production and distribution of common and specialty chemicals has become mainstream. In the 1990s, the United Nations (UN) developed the *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)* to create international congruency among chemical suppliers. The GHS is an internationally agreed upon standard of classification and labeling that utilizes prescriptive, standardized testing procedures and criteria to classify hazardous materials.

The DOL published a revised *Hazard Communication Standard*(DOL 29 CFR 1910.1200) to align with the GHS in March 2012. It became effective in May 2012. All manufacturers selling, producing or transporting chemicals in the United States are now required to comply with the GHS and provide this standardized hazard information on all Safety Data Sheets (SDS).

SDS are a primary source of information for identifying hazards for chemicals and mixtures containing hazardous materials. It can be helpful for fire code officials to become familiar with the GHS definitions and how they relate to *CFC* hazard definitions.

E104.2 GHS hazardous materials definitions comparison table. Table E104.2 provides a tabular presentation of the various definitions published within the *California Fire Code*. In addition, the table presents corresponding definitions, where available, from the 2012 edition of DOL 29 CFR 1910.1200 along with applicable hazard statement codes. DOL 29 CFR 1910.1200 aligns with the UN's *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)*. The table is not meant to imply perfect alignment between *CFC* and GHS definitions.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Aerosol	—	A combination of a container, a propellant and a material that is dispensed. Aerosol products shall be classified by means of the calculation of their chemical heats of combustion and shall be designated Level 1, Level 2 or Level 3.	Any nonrefillable receptacles made of metal, glass or plastics and containing a gas compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state.
Aerosol	Level 1	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 3; Pressurized container: May burst if heated. 1. Any aerosol that contains ≤ 1% flammable components (by mass) and that has a heat of combustion < 20 kJ/g. 2. Any aerosol that contains > 1% (by mass) flammable components or which has a heat of combustion of ≥ 20 kJ/g but which, based on the results of the ignition distance test, the enclosed space ignition test or the aerosol foam flammability test, does not meet the criteria for Category 1 or Category 2.
Aerosol	Level 2	Those with a total chemical heat of combustion that is less than or equal to 8,600 Btu/lb (20 kJ/g).	H223, Category 2; Flammable aerosol. Pressurized container: May burst if heated: 1. Any aerosol that dispenses a spray that, based on the results of the ignition distance test, does not meet the criteria for Category 1, and which has: a. A heat of combustion of ≥ 20 kJ/g. b. A heat of combustion of < 20 kJ/g along with an ignition distance of ≥ 15 cm; or c. A heat of combustion of < 20 kJ/g and an ignition distance of < 15 cm along with either, in the enclosed space ignition test a time: i. A time equivalent of ≤ 300 s/m^3; or ii. A deflagration density of ≤ 300 g/m^3; or 2. Any aerosol that dispenses a foam that, based on the results of the aerosol foam flammability test, does not meet the criteria for Category 1, and which has a flame height of ≥ 4 cm and a flame duration of ≥ 2 s.
Aerosol	Level 3	Those with a total chemical heat of combustion that is greater than 13,000 Btu/lb (30 kJ/g).	H222, Category 1; Extremely flammable aerosol. Pressurized container: May burst if heated: 1. Any aerosol that contains ≥ 85% flammable components (by mass) and has a heat of combustion of ≥ 30 kJ/g. 2. Any aerosol that dispenses a spray that, in the ignition distance test, has an ignition distance of ≥ 75 cm. 3. Any aerosol that dispenses a foam that, in the foam flammability test, has: a. A flame height of ≥ 20 cm and a flame duration of ≥ 2 s. b. A flame height of ≥ 4 cm and a flame duration of ≥ 7 s.
Combustible liquid	—	A liquid having a closed cup flash point at or above 100°F (38°C). Combustible liquids shall be subdivided as follows:	A flammable liquid means a liquid having a flash point of not more than 93°C.
Combustible liquid	II	Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).	H226, Category 3; Flammable liquid and vapor: Flash point ≥ 23°C and ≤ 60°C
Combustible liquid	IIIA	Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).	H227, Category 4; Combustible liquid: Flash point > 60°C and ≤ 93°C
Combustible liquid	IIIB	Liquids having closed cup flash points at or above 200°F (93°C).	N/A

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Compressed gas	—	A material or mixture of materials that: 1. Is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure, and 2. Has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa) which is either liquefied, nonliquefied or in solution, except those gases that have no other health- or physical-hazard properties are not considered to be compressed until the pressure in the packaging exceeds 41 psia (282 kPa) at 68°F (20°C). States of compressed gases: 1. Nonliquefied compressed gases are gases, other than those in solution, that are in a packaging under the charged pressure and are entirely gaseous at a temperature of 68°F (20°C). 2. Liquefied compressed gases are gases that, in a packaging under the charged pressure, are partially liquid at a temperature of 68°F (20°C). 3. Compressed gases in solution are nonliquefied gases that are dissolved in a solvent. 4. Compressed gas mixtures consist of a mixture of two or more compressed gases contained in a packaging, the hazard properties of which are represented by the properties of the mixture as a whole.	Gases under pressure are gases which are contained in a receptacle at a pressure of 200 kPa (gauge) or more at 20°C, or which are liquefied, or liquefied and refrigerated. H280, Compressed gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ -50°C (-58°F). H280, Liquefied gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is partially liquid at temperatures above -50°C (-58°F). H280, Dissolved gas; Contains gas under pressure: May explode if heated. A gas which when under pressure is dissolved in a liquid phase solvent.
Corrosive	—	A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the point of contact. A chemical shall be considered corrosive if, when tested on the intact skin of albino rabbits by the method described in DOTn 49 CFR 173.137, such chemical destroys or changes irreversibly the structure of the tissue at the point of contact following an exposure period of 4 hours. This term does not refer to action on inanimate surfaces.	H314, Category 1 (1A, 1B, 1C); Causes severe skin burns and eye damage. Skin corrosion refers to the production of irreversible damage to the skin; namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.
Cryogenic fluid	—	A fluid having a boiling point lower than -130°F (-89.9°C) at 14.7 pounds per square inch atmosphere (psia) (an absolute pressure of 101.3 kPa).	H281, Refrigerated liquefied gas; Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.
Cryogenic flammable	—	A cryogenic fluid that is flammable in its vapor state.	H220, Category 1A; Extremely flammable gas. Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points, regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. H281, refrigerated liquefied gas, would also apply.
Cryogenic—Inert	—	A cryogenic fluid that is inert.	H281, Refrigerated liquefied gas. Contains refrigerated gas: May cause cryogenic burns or injury. A gas which is made partially liquid because of its low temperature.
Cryogenic—Oxidizing	—	An oxidizing gas in the cryogenic state.	H270, Category 1: May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H281, refrigerated liquefied gas, would also apply.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Explosives	—	A chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters. The term "Explosive" includes any material determined to be within the scope of USC Title 18: Ch. 40 and also includes any material classified as an explosive other than consumer fireworks, Division 1.4G Explosives, by the hazardous materials regulations of DOTn 49 CFR Parts 100–185.	An explosive substance (or mixture) is a solid or liquid substance (or mixture of substances) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.
Explosives	Unstable explosives		H200; Unstable explosive. Unstable explosives are those which are thermally unstable and/or too sensitive for normal handling, transport and use. Special precautions are necessary.
Explosives	Division 1.1	Explosives that have a mass explosion hazard. A mass explosion is one which affects almost the entire load instantaneously.	H201; Explosive; mass explosion hazard. Substances, mixtures and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).
Explosives	Division 1.2	Explosives that have a projection hazard but not a mass explosion hazard.	H202; Explosive; severe projection hazard. Substances, mixtures and articles which have a projection hazard but not a mass explosion hazard.
Explosives	Division 1.3	Explosives that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	H203; Explosive; fire, blast or projection hazard. Substances, mixtures and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard: 1. Combustion of which gives rise to considerable radiant heat; or 2. Which burn one after another, producing minor blast or projection effects or both.
Explosives	Division 1.4	Explosives that pose a minor explosion hazard. The explosive effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.	H204; Fire or projection hazard: Substances, mixtures and articles which present no significant hazard; substances, mixtures and articles which present only a small hazard in the event of ignition or initiation. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of almost the entire contents of the package.
Explosives	Division 1.4G	Small fireworks devices containing restricted amounts of pyrotechnic composition designed primarily to produce visual or audible effects by combustion or deflagration that complies with the construction, chemical composition and labeling regulations of the DOTn for fireworks, UN No. 0336 and the US Consumer Product Safety Commission as set forth in CPSC 16 CFR Parts 1500 and 1507.	N/A
Explosives	Division 1.5	Very insensitive explosives. This division is comprised of substances that have a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.	H205; May mass explode in fire. Very insensitive substances or mixtures which have a mass explosion hazard: substances and mixtures which have a mass explosion hazard but are so insensitive that there is very little probability or initiation or of transition from burning to detonation under normal conditions.
Explosives	Division 1.6	Extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles that contain only extremely insensitive detonating substances and that demonstrate a negligible probability of accidental initiation or propagation.	Extremely insensitive articles which do not have a mass explosion hazard: articles which predominantly contain extremely insensitive substances or mixtures and which demonstrate a negligible probability of accidental initiation or propagation.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Flammable gas	Gaseous	A material that is a gas at 68°F (20°C) or less at 14.7 psia (101 kPa) of pressure [a material that has a boiling point of 68°F (20°C) or less at 14.7 psia (101 kPa)] which: 1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13% or less by volume with air; or 2. Has a flammable range at 14.7 psia (101 kPa) with air of not less than 12%, regardless of the lower limit. The limits specified shall be determined at 14.7 psia (101 kPa) of pressure and a temperature of 68°F (20°C) in accordance with ASTM E681.	A flammable gas is a gas having a flammable range with air at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A; Extremely flammable gas. Gases, which at 20°C and a standard pressure of 101.3 kPa: 1. Are ignitable when in a mixture of 13% or less by volume in air; or 2. Have a flammable range with air of at least 12 percentage points regardless of the lower flammability limit unless data show they meet the criteria for Category 1B. Category 1A includes pyrophoric gases and chemically unstable gases. H220, Category 1B; Flammable gas. Gases which meet the flammability criteria for Category 1A, but which are not pyrophoric nor chemically unstable, and which have at least either: 1. A lower flammability limit of more than 6% by volume in air; or 2. A fundamental burning velocity of less than 10 cm/s. H280, compressed gas, would also apply.
Flammable liquid	—	A liquid having a closed cup flash point below 100°F (38°C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:	A liquid having a flash point of not more than 93°C. A flammable liquid is classified in one of the four categories for this class.
Flammable liquid	IA	Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).	H224, Category 1; Extremely flammable liquid and vapor. Flash point < 23°C and initial boiling point ≤ 35°C
Flammable liquid	IB	Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).	H225, Category 2; Highly flammable liquid and vapor. Flash point < 23°C and initial boiling point > 35°C
Flammable liquid	IC	Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).	H226, Category 3; Flammable liquid and vapor. Flash point ≥ 23°C and ≤ 60°C
Flammable solid	—	A solid, other than a blasting agent or explosive, that is capable of causing fire through friction, absorption of moisture, spontaneous chemical change or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F (100°C) or which burns so vigorously and persistently when ignited as to create a serious hazard. A chemical shall be considered a flammable solid, as determined in accordance with the test method of CPSC 16 CFR Part 1500.44, if it ignites and burns with a self-sustained flame at a rate greater than 0.0866 inch (2.2 mm) per second along its major axis.	A flammable solid is a solid which is readily combustible, or may cause or contribute to fire through friction. A flammable solid is classified in one of the two categories for this class using method N.1 as described in Part III, subsection 33.2.1 of the Manual of Tests and Criteria, according to: H228, Category 1; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone does not stop fire; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time ≤ 5 min H228, Category 2; Flammable solid: Burning rate test: Substances or mixtures other than metal powders: 1. Wetted zone stops the fire for at least 4 min; and 2. Burning time < 45 s or burning rate > 2.2 mm/s. Metal powders: burning time > 5 min and ≤ 10 min

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Highly toxic	—	A material that produces a lethal dose or lethal concentration that falls within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of 200 mg or less per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of 200 ppm by volume or less of gas or vapor, or 2 mg/l or less of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g.	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H300, Category 1; Fatal if swallowed: LD50 ≤ 5 mg/kg bodyweight H300, Category 2; Fatal if swallowed: LD50 > 5 ≤ 50 mg/kg bodyweight Dermal H310, Category 1; Fatal in contact with skin: LD50 ≤ 50 mg/kg bodyweight H310, Category 2; Fatal in contact with skin: LD50 > 50 ≤ 200 mg/kg bodyweight Inhalation H330, Category 1; Fatal if inhaled. Gases: LC50 ≤ 100 ppm (4 hr) ≈ 200 ppm (1 hr) Vapors: LC50 ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) Dust/mist: LC50 ≤ 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr)
Inert gas	—	A gas that is capable of reacting with other materials only under abnormal conditions such as high temperatures, pressures and similar extrinsic physical forces. Within the context of the code, inert gases do not exhibit either physical or health hazard properties as defined (other than acting as a simple asphyxiant) or hazard properties other than those of a compressed gas. Some of the more common inert gases include argon, helium, krypton, neon, nitrogen and xenon.	Gases under pressure are gases which are contained in receptacles at a pressure of 200 kPa (gauge) or more at 20°C or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases. See the description of “Compressed gas.”
Organic peroxide	—	An organic compound that contains the bivalent -O-O- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by an organic radical. Organic peroxides can present an explosion hazard (detonation or deflagration) or they can be shock sensitive. They can also decompose into various unstable compounds over an extended period of time.	Organic peroxides are liquid or solid organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals. The term also includes organic peroxide formulations (mixtures). Organic peroxides are thermally unstable substances or mixtures, which may undergo exothermic self-accelerating decomposition. In addition, they may have one or more of the following properties: 1. Be liable to explosive decomposition. 2. Burn rapidly. 3. Be sensitive to impact or friction. 4. React dangerously with other substances.
Organic peroxide	UD	Organic peroxides that are capable of detonation. These peroxides pose an extremely high-explosion hazard through rapid explosive decomposition.	H240, Organic peroxide, Type A; Heating may cause an explosion. Any organic peroxide which, as packaged, can detonate or deflagrate rapidly will be defined as organic peroxide Type A.
Organic peroxide	I	Describes those formulations that are capable of deflagration but not detonation.	H241, Organic peroxide, Type B; Heating may cause a fire or explosion. Any organic peroxide possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly but is liable to undergo a thermal explosion in that package will be defined as organic peroxide Type B.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Organic peroxide	II	Describes those formulations that burn very rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type C; Heating may cause a fire. Any organic peroxide possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as organic peroxide Type C. H242, Organic peroxide, Type D; Heating may cause a fire. Any organic peroxide which in laboratory testing: Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as organic peroxide Type D.
Organic peroxide	III	Describes those formulations that burn rapidly and that pose a moderate reactivity hazard.	H242, Organic peroxide, Type E; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as organic peroxide Type E.
Organic peroxide	IV	Describes those formulations that burn in the same manner as ordinary combustibles and that pose a minimal reactivity hazard.	H242, Organic peroxide, Type F; Heating may cause a fire. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as organic peroxide Type F.
Organic peroxide	V	Describes those formulations that burn with less intensity than ordinary combustibles or do not sustain combustion and that pose no reactivity hazard.	Organic peroxide, Type G. Any organic peroxide which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C or higher for a 50 kg package), and for liquid mixtures, a diluent having a boiling point of not less than 150°C and used for desensitization will be defined as organic peroxide Type G. If the organic peroxide is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, it shall be defined as organic peroxide Type F.
Oxidizer	—	A material that readily yields oxygen or other oxidizing gas, or that readily reacts to promote or initiate combustion of combustible materials and, if heated or contaminated, can result in vigorous self-sustained decomposition.	An oxidizing solid is a solid which, while in itself is not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material. An oxidizing liquid is a liquid which, while in itself not necessarily combustible, may, generally by yielding oxygen, cause, or contribute to, the combustion of other material.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Oxidizer	4	An oxidizer that can undergo an explosive reaction due to contamination or exposure to a thermal or physical shock that causes a severe increase in the burning rate of combustible materials with which it comes into contact. Additionally, the oxidizer causes a severe increase in the burning rate and can cause spontaneous ignition of combustibles.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.
Oxidizer	3	An oxidizer that causes a severe increase in the burning rate of combustible materials with which it comes in contact.	H271, Category 1; May cause fire or explosion; strong oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture (by mass) of potassium bromate and cellulose. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture (by mass) of substance and cellulose is less than that of a 1:1 mixture (by mass) of 50% perchloric acid and cellulose.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Oxidizer	2	An oxidizer that will cause a moderate increase in the burning rate of combustible materials with which it comes in contact.	H272, Category 2; May intensify fire; oxidizer. Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for Category 1 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose and the criteria for Category 1 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 40% aqueous sodium chlorate solution and cellulose and the criteria for Category 1 are not met.
Oxidizer	1	An oxidizer that does not moderately increase the burning rate of combustible materials.	H272, Category 3; May intensify fire; oxidizer: Criteria for solids (based on Test O.1 or O.3 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Test O.1—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for Categories 1 and 2 are not met. Test O.3—Any substance or mixture which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose and the criteria for Categories 1 and 2 are not met. Criteria for liquids (based on Test O.2 in Part III of UN ST/SG/AC.10/11, *Manual of Tests and Criteria*): Any substance or mixture which, in the 1:1 mixture (by mass) of substance (or mixture) and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture (by mass) of a 65% aqueous nitric acid solution and cellulose and the criteria for Categories 1 and 2 are not met.
Oxidizing gas	Gaseous	A gas that can support and accelerate combustion of other materials more than air does.	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer: Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H280, compressed gas would also apply.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Oxidizing gas	Liquified	An oxidizing gas that is liquefied [liquefied gases are gases that, in a packaging under the charged pressure, are partially liquid at 68°F (20°C)].	Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H270, Category 1; May cause or intensify fire; oxidizer. Any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. H280, liquefied gas, would also apply.
Pyrophoric	—	A chemical with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	Separate definitions based on physical state; see each category of pyrophoric:
Pyrophoric	Solid	A solid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric solid; Catches fire spontaneously if exposed to air. A pyrophoric solid is a solid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The solid ignites within 5 minutes of coming into contact with air.
Pyrophoric	Liquid	A liquid with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H250, Category 1; Pyrophoric liquid; Catches fire spontaneously if exposed to air: A pyrophoric liquid is a liquid which, even in small quantities, is liable to ignite within 5 minutes after coming into contact with air. Classification criteria: The liquid ignites within 5 minutes when added to an inert carrier and exposed to air, or it ignites or chars a filter paper on contact with air within 5 minutes. Testing is performed at 25 ±2°C and 50 ±5% relative humidity.
Pyrophoric	Gas	A gas with an autoignition temperature in air, at or below a temperature of 130°F (54°C).	H220, Category 1A; Extremely flammable gas. May ignite spontaneously if exposed to air: A pyrophoric gas is a flammable gas that is liable to ignite spontaneously in air at a temperature of 54°C or below. H280, compressed (or liquefied) gas, would also apply.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Toxic	—	A chemical falling within any of the following categories: 1. A chemical that has a median lethal dose (LD50) of more than 50 mg per kg, but not more than 500 mg per kg of body weight when administered orally to albino rats weighing between 200 and 300 g each. 2. A chemical that has a medial lethal dose (LD50) of more than 200 mg per kg but not more than 1,000 mg per kg of body weight when administered by continuous contact for 24 hr (or less if death occurs within 24 hr) with the bare skin of albino rabbits weighing between 2 and 3 kg each. 3. A chemical that has a median lethal concentration (LC50) in air of more than 200 ppm but not more than 2,000 ppm by volume or less of gas or vapor, or more than 2 mg/l but not more than 20 mg/l of mist, fume or dust, when administered by continuous inhalation for 1 hr (or less if death occurs within 1 hr) to albino rats weighing between 200 and 300 g	Acute toxicity refers to serious adverse health effects (i.e., lethality) occurring after a single or short-term oral, dermal or inhalation exposure to a substance or mixture. Oral H301, Category 3; Toxic if swallowed: LD50 > 50 ≤ 300 mg/kg bodyweight H302, Category 4; Harmful if swallowed: LD50 > 300 ≤ 2,000 mg/kg bodyweight Dermal H311, Category 3, Toxic in contact with skin: LD50 > 200 ≤ 1,000 mg/kg bodyweight Inhalation H330, Category 2; Fatal if inhaled: Gases: LC50 > 100 ppm (4 hr) ≈ 200 ppm (1 hr) ≤ 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) Vapours: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) Dust/mist: LC50 > 0.05 mg/l (4 hr) ≈ 0.2 mg/l (1 hr) ≤ 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) H331, Category 3; Toxic if inhaled: Gases: LC50 > 500 ppm (4 hr) ≈ 1,000 ppm (1 hr) ≤ 2,500 ppm (4 hr) ≈ 5,000 ppm (1 hr) Vapours: LC50 > 2 mg/l (4 hr) ≈ 8 mg/l (1 hr) ≤ 10 mg/l (4 hr) ≈ 40 mg/l (1 hr) Dust/mist: LC50 > 0.5 mg/l (4 hr) ≈ 2 mg/l (1 hr) ≤ 1 mg/l (4 hr) ≈ 4 mg/l (1 hr)
Unstable (reactive)	—	A material, other than an explosive, which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or become self-reactive and undergo other violent chemical changes, including explosion, when exposed to heat, friction or shock, or in the absence of an inhibitor, or in the presence of contaminants, or in contact with incompatible materials. Unstable (reactive) materials are subdivided as follows:	Self-reactive substances or mixtures are thermally unstable liquids or solid substances or mixtures liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). This definition excludes substances and mixtures classified under the GHS as explosives, organic peroxides or as oxidizing. A self-reactive substance or mixture is regarded as possessing explosive properties when in laboratory testing the formulation is liable to detonate, to deflagrate rapidly or to show a violent effect when heated under confinement.
Unstable (reactive)	4	Materials that in themselves are readily capable of detonation or of explosive decomposition or explosive reaction at normal temperatures and pressures. This class includes materials that are sensitive to mechanical or localized thermal shock at normal temperatures and pressures.	H240, Type A; Heating may cause an explosion. Any self-reactive substance or mixture which can detonate or deflagrate rapidly, as packaged, will be defined as self-reactive substance Type A.
Unstable (reactive)	3	Materials that in themselves are capable of detonation or of explosive decomposition or explosive reaction but which require a strong initiating source or which must be heated under confinement before initiation. This class includes materials that are sensitive to thermal or mechanical shock at the elevated temperatures and pressures.	H241, Type B; Heating may cause a fire or explosion. Any self-reactive substance or mixture possessing explosive properties and which, as packaged, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in that package will be defined as self-reactive substance Type B.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Unstable (reactive)	2	Materials that in themselves are normally unstable and readily undergo violent chemical change but do not detonate. This class includes materials that can undergo chemical change with rapid release of energy at normal temperatures and pressures, and that can undergo violent chemical change at elevated temperatures and pressures.	H242, Type C; Heating may cause a fire. Any self-reactive substance or mixture possessing explosive properties when the substance or mixture as packaged cannot detonate or deflagrate rapidly or undergo a thermal explosion will be defined as self-reactive substance Type C. H242, Type D; Heating may cause a fire. Any self-reactive substance or mixture which in laboratory testing: • Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement; or • Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or • Does not detonate or deflagrate at all and shows a medium effect when heated under confinement; will be defined as self-reactive substance Type D; Will be defined as self-reactive substance Type D.
Unstable (reactive)	1	Materials that in themselves are normally stable but which can become unstable at elevated temperatures and pressures.	H242, Type E; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates nor deflagrates at all and shows low or no effect when heated under confinement will be defined as self-reactive substance Type E. H242, Type F; Heating may cause a fire. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power will be defined as self-reactive substance Type F. Any self-reactive substance or mixture which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows no effect when heated under confinement nor any explosive power, provided that it is thermally stable (self-accelerating decomposition temperature is 60°C to 75°C for a 50 kg package), and for liquid mixtures, a diluent having a boiling point greater than or equal to 150°C and used for desensitization will be defined as self-reactive substance Type G. If the mixture is not thermally stable or is a diluent having a boiling point less than 150°C and is used for desensitization, the mixture shall be defined as self-reactive substance Type F.
Unstable (reactive) gas	Gaseous		A chemically unstable gas is a flammable gas that is able to react explosively even in the absence of air or oxygen. H220, Category 1A, Category A; Extremely flammable gas; May react explosively even in the absence of air. Flammable gases which are chemically unstable at 20°C and a standard pressure of 101.3 kPa. H220, Category 1A, Category B; Extremely flammable gas; May react explosively even in the absence of air at elevated pressure and/or temperature. Flammable gases which are chemically unstable at a temperature greater than 20°C and/or a standard pressure greater than 101.3 kPa. H280, compressed gas, would also apply.

TABLE E104.2—*CFC* AND GHS HAZARD DEFINITIONS COMPARISON[a]—continued

CFC MATERIAL	*CFC* CLASS	*CFC* DEFINITION	GHS 2017 (REV 7) CLASSIFICATION (H-CODE AND CATEGORY); HAZARD STATEMENT; DEFINITION
Water reactive	3	Materials that react explosively with water without requiring heat or confinement.	H260, Category 1; Contact with water releases flammable gases which may ignite spontaneously. Any substance or mixture which reacts vigorously with water at ambient temperatures and demonstrates generally a tendency for the gas produced to ignite spontaneously, or which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 liters per kilogram of substance over any 1 minute. (UN/DOT test methods: Test N.5, Part III, subsection 33.4.1.4)
Water reactive	2	Materials that react violently with water or have the ability to boil water. Materials that produce flammable, toxic or other hazardous gases, or evolve enough heat to cause autoignition of combustibles upon exposure to water or moisture.	H261, Category 2; Contact with water releases flammable gas. Any substance or mixture which reacts readily with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 20 liters per kilogram of substance per hour, and which does not meet the criteria for Category 1.
Water reactive	1	Materials that react with water with some release of energy, but not violently.	H261, Category 3; Contact with water releases flammable gas. Any substance or mixture which reacts slowly with water at ambient temperatures such that the maximum rate of evolution of flammable gas is equal to or greater than 1 liter per kilogram of substance per hour, and which does not meet the criteria for Categories 1 and 2.

a. The table illustrates that there is not perfect alignment between the *CFC* and GHS definitions and provides information on similarities and difference between the two classification systems.

SECTION E105—REFERENCED STANDARDS

E105.1 General. See Table E105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE E105.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CGA P-20—2009	*Standard for Classification of Toxic Mixtures*	E103.1.3.1
CGA P-23—2008	*Standard for Categorizing Gas Mixtures Containing Flammable and Nonflammable Components*	E102.1.2
DOL 29 CFR Part 1910—2023	*Occupational Safety and Health Standards*	E104.1
DOL 29 CFR Part 1910.1200—2012	*Hazard Communication*	E102.1.7.2, E104.1, E104.2
DOTn 49 CFR—2023	*Transportation*	E104.1
DOTn 49 CFR Part 173.127—2005	*Class 5, Division 5.1—Definition and Assignment of Packing Groups*	E102.1.7.2
UN ST/SG/AC.10/11 (Rev. 7)—2019	*Manual of Tests and Criteria*	Table E104.2
UN ST/SG/AC.10/1 (Rev 21)—2019	*Recommendations on the Transport of Dangerous Goods*	Table E104.2
UN ST/SG/AC.10/30 (Rev.7)—2017	*Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Part 2: Physical Hazards*	E102.1.7.2, E104.1, E104.2, Table E104.2

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX F – HAZARD RANKING

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

F HAZARD RANKING

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix F is intended to be a companion to the specific requirements of Chapters 51 through 67, which regulate the storage, handling and use of all hazardous materials classified as either physical or health hazards. These materials pose diverse hazards, including instability, reactivity, flammability, oxidizing potential or toxicity; therefore, identifying them by hazard ranking is essential. This appendix lists the various hazardous material categories that are defined in this code, along with the NFPA 704 hazard ranking for each.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION F101—GENERAL

F101.1 Scope. Assignment of levels of hazards to be applied to specific hazard classes as required by NFPA 704 shall be in accordance with this appendix. The appendix is based on application of the degrees of hazard as defined in NFPA 704 arranged by hazard class as for specific categories defined in Chapter 2 of the *California Fire Code* and used throughout.

F101.2 General. The hazard rankings shown in Table F101.2 have been established by using guidelines found within NFPA 704. As noted in Section 4.2 of NFPA 704, there could be specific reasons to alter the degree of hazard assigned to a specific material; for example, ignition temperature, flammable range or susceptibility of a container to rupture by an internal combustion explosion or to metal failure while under pressure or because of heat from external fire. As a result, the degree of hazard assigned for the same material can vary when assessed by different people of equal competence.

The hazard rankings assigned to each class represent reasonable minimum hazard levels for a given class based on the use of criteria established by NFPA 704. Specific cases of use or storage may dictate the use of higher degrees of hazard in certain cases.

TABLE F101.2—FIREFIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES

HAZARD CATEGORY	DESIGNATION
Combustible liquid II	F2
Combustible liquid IIIA	F2
Combustible liquid IIIB	F1
Combustible dust	F3 or F2[a]
Combustible fiber	F3
Cryogenic flammable	F4, H3
Cryogenic oxidizing	OX, H3
Explosive	R4
Flammable solid	F2
Flammable gas (gaseous)	F4
Flammable gas (liquefied)	F4
Flammable liquid IA	F4
Flammable liquid IB	F3
Flammable liquid IC	F3
Organic peroxide, UD	R4
Organic peroxide I	F4, R3
Organic peroxide II	F3, R3
Organic peroxide III	F2, R2
Organic peroxide IV	F1, R1
Organic peroxide V	None
Oxidizing gas (gaseous)	OX
Oxidizing gas (liquefied)	OX

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TABLE F101.2—FIREFIGHTER WARNING PLACARD DESIGNATIONS BASED ON HAZARD CLASSIFICATION CATEGORIES—continued	
HAZARD CATEGORY	**DESIGNATION**
Oxidizer 4	OX4
Oxidizer 3	OX3
Oxidizer 2	OX2
Oxidizer 1	OX1
Pyrophoric gases	F4
Pyrophoric solids, liquids	F3
Unstable reactive 4D	R4
Unstable reactive 3D	R4
Unstable reactive 3N	R2
Unstable reactive 2	R2
Unstable reactive 1	None
Water reactive 3	W3
Water reactive 2	W2
Corrosive	H3, COR
Toxic	H3
Highly toxic	H4

a. F3 = Finely divided solids, typically less than 75 micrometers (μm) (200 mesh), that pose an elevated risk of forming an ignitable dust cloud, such as finely divided sulfur, *the California Electrical Code* Group E dusts (for example, aluminum, zirconium and titanium) and bisphenol A. F2 = Finely divided solids less than 420 μm (40 mesh) that pose an ordinary risk of forming an ignitable dust cloud.
F—Flammable category.
R—Reactive category.
H—Health category.
W—Special hazard: water reactive.
OX—Special hazard: oxidizing properties.
COR—Corrosive.
UD—Unclassified detonable material.
4D—Class 4 detonable material.
3D—Class 3 detonable material.
3N—Class 3 nondetonable material.

SECTION F102—REFERENCED STANDARDS

F102.1 General. See Table F102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE F102.1—REFERENCED STANDARDS		
STANDARD ACRONYM	**STANDARD NAME**	**SECTIONS HEREIN REFERENCED**
CEC—25	*California Electrical Code*	Table F101.2
NFPA 704—22	*Identification of the Hazards of Materials for Emergency Response*	F101.1, F101.2

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX G – CRYOGENIC FLUIDS—WEIGHT AND VOLUME EQUIVALENTS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

G

CRYOGENIC FLUIDS—WEIGHT AND VOLUME EQUIVALENTS

This appendix is for information purposes and is not intended for adoption.

User notes:

About this appendix: Appendix G gives the fire code official and registered design professional a ready reference tool for the conversion of the liquid weight and volume of cryogenic fluid to their corresponding volume of gas and vice versa and is a companion to the provisions of Chapter 55 of this code.

SECTION G101—GENERAL

G101.1 Scope. This appendix is used to convert from liquid to gas for cryogenic fluids.

G101.2 Conversion. Table G101.2 shall be used to determine the equivalent amounts of cryogenic fluids in either the liquid or gas phase.

TABLE G101.2—WEIGHT AND VOLUME EQUIVALENTS FOR COMMON CRYOGENIC FLUIDS

CRYOGENIC FLUID	WEIGHT OF LIQUID OR GAS		VOLUME OF LIQUID AT NORMAL BOILING POINT		VOLUME OF GAS AT NTP	
	Pounds	Kilograms	Liters	Gallons	Cubic feet	Cubic meters
Argon	1.000	0.454	0.326	0.086	9.67	0.274
	2.205	1.000	0.718	0.190	21.32	0.604
	3.072	1.393	1.000	0.264	29.71	0.841
	11.628	5.274	3.785	1.000	112.45	3.184
	10.340	4.690	3.366	0.889	100.00	2.832
	3.652	1.656	1.189	0.314	35.31	1.000
Helium	1.000	0.454	3.631	0.959	96.72	2.739
	2.205	1.000	8.006	2.115	213.23	6.038
	0.275	0.125	1.000	0.264	26.63	0.754
	1.042	0.473	3.785	1.000	100.82	2.855
	1.034	0.469	3.754	0.992	100.00	2.832
	0.365	0.166	1.326	0.350	35.31	1.000
Hydrogen	1.000	0.454	6.409	1.693	191.96	5.436
	2.205	1.000	14.130	3.733	423.20	11.984
	0.156	0.071	1.000	0.264	29.95	0.848
	0.591	0.268	3.785	1.000	113.37	3.210
	0.521	0.236	3.339	0.882	100.00	2.832
	0.184	0.083	1.179	0.311	35.31	1.000
Oxygen	1.000	0.454	0.397	0.105	12.00	0.342
	2.205	1.000	0.876	0.231	26.62	0.754
	2.517	1.142	1.000	0.264	30.39	0.861
	9.527	4.321	3.785	1.000	115.05	3.250
	8.281	3.756	3.290	0.869	100.00	2.832
	2.924	1.327	1.162	0.307	35.31	1.000
Nitrogen	1.000	0.454	0.561	0.148	13.80	0.391
	2.205	1.000	1.237	0.327	30.43	0.862
	1.782	0.808	1.000	0.264	24.60	0.697
	6.746	3.060	3.785	1.000	93.11	2.637
	7.245	3.286	4.065	1.074	100.00	2.832
	2.558	1.160	1.436	0.379	35.31	1.000

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TABLE G101.2—WEIGHT AND VOLUME EQUIVALENTS FOR COMMON CRYOGENIC FLUIDS—continued

CRYOGENIC FLUID	WEIGHT OF LIQUID OR GAS		VOLUME OF LIQUID AT NORMAL BOILING POINT		VOLUME OF GAS AT NTP	
	Pounds	Kilograms	Liters	Gallons	Cubic feet	Cubic meters
LNG[a]	1.000	0.454	1.052	0.278	22.968	0.650
	2.205	1.000	2.320	0.613	50.646	1.434
	0.951	0.431	1.000	0.264	21.812	0.618
	3.600	1.633	3.785	1.000	82.62	2.340
	4.356	1.976	4.580	1.210	100.00	2.832
	11.501	5.217	1.616	0.427	35.31	1.000

For SI: 1 pound = 0.454 kg, 1 gallon = 3.785 L, 1 cubic foot = 0.02832 m^3, °C = [(°F) – 32]/1.8, 1 pound per square inch atmosphere = 6.895 kPa.

a. The values listed for liquefied natural gas (LNG) are "typical" values. LNG is a mixture of hydrocarbon gases, and no two LNG streams have exactly the same composition.

G101.2.1 Use of the table. To use Table G101.2, read horizontally across the line of interest. For example, to determine the number of cubic feet of gas contained in 1.0 gallon (3.785 L) of liquid argon, find 1.000 in the column entitled "Volume of Liquid at Normal Boiling Point." Reading across the line under the column entitled "Volume of Gas at NTP" (70°F and 1 atmosphere/14.7 psia), the value of 112.45 cubic feet (3.184 m^3) is found.

G101.2.2 Other quantities. If other quantities are of interest, the numbers can be multiplied or divided to obtain the quantity of interest. For example, to determine the number of cubic feet of argon gas contained in a volume of 1,000 gallons (3785 L) of liquid argon at its normal boiling point, multiply 112.45 by 1,000 to obtain 112,450 cubic feet (3184 m^3).

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX H – HAZARDOUS MATERIALS MANAGEMENT PLAN AND HAZARDOUS MATERIALS INVENTORY STATEMENTS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter			X																				
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
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APPENDIX

H

HAZARDOUS MATERIALS MANAGEMENT PLANS AND HAZARDOUS MATERIALS INVENTORY STATEMENTS (SEE SECTIONS 5001.5.1 AND 5001.5.2)

SECTION H1—SCOPE

H1.1 Scope. *Hazardous materials inventory statements (HMIS) and hazardous materials management plans (HMMP) which are required by the fire chief, pursuant to Chapter 50, shall be provided for hazardous materials in accordance with Appendix H.*

Exceptions:

1. *Materials which have been satisfactorily demonstrated not to present a potential danger to public health, safety or welfare, based upon the quantity or condition of storage, when approved.*
2. *Chromium, copper, lead, nickel and silver need not be considered hazardous materials for the purposes of Appendix H unless they are stored in a friable, powdered or finely divided state.*

Proprietary and trade secret information shall be protected under the laws of the state or jurisdiction having authority.

SECTION H2—HAZARDOUS MATERIALS INVENTORY STATEMENTS (HMIS)

H2.1 When Required. *A separate HMIS shall be provided for each building, including its appurtenant structures, and each exterior facility in which hazardous materials are stored.*

The hazardous materials inventory statement shall list, by hazard class, all hazardous materials stored. The hazardous materials inventory statement shall include the following information for each hazardous material listed:

1. *Hazard class.*
2. *Common or trade name.*
3. *Chemical name, major constituents and concentrations if a mixture. If a waste, the waste category.*
4. *Chemical Abstract Service number (CAS number) found in 29 Code of Federal Regulations (C.F.R.).*
5. *Whether the material is pure or a mixture, and whether the material is a solid, liquid or gas.*
6. *Maximum aggregate quantity stored at any one time.*
7. *Storage conditions related to the storage type, temperature and pressure.*

H2.2 Changes to HMIS. *An amended HMIS shall be provided within 30 days of the storage of any hazardous materials which changes or adds a hazard class or which is sufficient in quantity to cause an increase in the quantity which exceeds 5 percent for any hazard class.*

SECTION H3—HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP)

H3.1 General. *Applications for a permit to store hazardous materials shall include an HMMP standard form or short form in accordance with Section H3.3 and shall provide a narrative description of the operations and processes taking place at the facility. See Figure A-H-1.*

H3.2 Information Required. *The HMMP standard form shall include the information detailed in Section H3.2.*

H3.2.1 General Information. *General information, including business name and address, emergency contacts, business activity, business owner or operator, SIC code, number of employees and hours, Dunn and Bradstreet number, and signature of owner, operator or designated representative.*

H3.2.2 General site plan. *A general site plan drawn at a legible scale which shall include, but not be limited to, the location of buildings, exterior storage facilities, permanent access ways, evacuation routes, parking lots, internal roads, chemical loading areas, equipment cleaning areas, storm and sanitary sewer accesses, emergency equipment and adjacent property uses. The exterior storage areas shall be identified with the hazard class and the maximum quantities per hazard class of hazardous materials stored. When required by the chief, information regarding the location of wells, flood plains, earthquake faults, surface water bodies and general land uses within 1 mile (1.609 km) of the facility boundaries shall be included.*

H3.2.3 Building floor plan. *A building floor plan drawn to a legible scale which shall include, but not be limited to, hazardous materials storage areas within the building and shall indicate rooms, doorways, corridors, means of egress and evacuation routes. Each hazardous materials storage facility shall be identified by a map key which lists the individual hazardous materials, their hazard class and quantity present for each area.*

H3.2.4 Hazardous materials handling. *Information showing that activities involving the handling of hazardous materials between the storage areas and manufacturing processes on site are conducted in a manner to prevent the accidental release of such materials.*

H3.2.5 Chemical capability and separation. *Information showing procedures, controls, signs or other methods used to ensure separation and protection of stored materials from factors which could cause accidental ignition or reaction of ignitable, reactive or incompatible materials in each area.*

H3.2.6 Monitoring program. *Information including, but not limited to, the location, type, manufacturer's specifications, if applicable, and suitability of monitoring methods for each storage facility when required.*

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H3.2.7 Inspection and recording keeping. *Schedules and procedures for inspecting safety and monitoring and emergency equipment. The permittee shall develop and follow a written inspection procedure acceptable to the chief for inspecting the facility for events or practices which could lead to unauthorized discharges of hazardous materials. Inspections shall be conducted at a frequency appropriate to detect problems prior to a discharge. An inspection check sheet shall be developed to be used in conjunction with routine inspections. The check sheet shall provide for the date, time and location of inspection; note problems and dates and times of corrective actions taken; and include the name of the inspector and the countersignature of the designated safety manager for the facility.*

H3.2.8 Employee training. *A training program appropriate to the types and quantities of materials stored or used shall be conducted to prepare employees to safely handle hazardous materials on a daily basis and during emergencies. The training program shall include:*

1. *Instruction in safe storage and handling of hazardous materials, including maintenance of monitoring records;*
2. *Instruction in emergency procedures for leaks, spills, fires or explosions, including shutdown of operations and evacuation procedures; and*
3. *Record-keeping procedures for documenting training given to employees.*

H3.2.9 Emergency response. *A description of facility emergency procedures is to be provided.*

H3.3 HMMP Short Form—(Minimal Storage Site). *A facility shall qualify as a minimal storage site if the quantity of each hazardous material stored in one or more facilities in an aggregate quantity for the facility is 500 pounds (227 kg) or less for solids, 55 gallons (208.2 L) or less for liquids, or 200 cubic feet (5.7 m^3) or less at NTP for compressed gases and does not exceed the threshold planning quantity as listed in 40 C.F.R., Part 355, Sections 302 and 304. The applicant for a permit for a facility which qualifies as a minimal storage site is allowed to file the short form HMMP. Such plan shall include the following components:*

1. *General facility information,*
2. *A simple line drawing of the facility showing the location of storage facilities and indicating the hazard class or classes and physical state of the hazardous materials being stored,*
3. *Information describing that the hazardous materials will be stored and handled in a safe manner and will be appropriately contained, separated and monitored, and*
4. *Assurance that security precautions have been taken, employees have been appropriately trained to handle the hazardous materials and react to emergency situations, adequate labeling and warning signs are posted, adequate emergency equipment is maintained, and the disposal of hazardous materials will be in an appropriate manner.*

SECTION H4—MAINTENANCE OF RECORDS

H4.1 *Hazardous materials inventory statements and hazardous materials management plans shall be maintained by the permittee for a period of not less than three years after submittal of updated or revised versions. Such records shall be made available to the fire chief upon request.*

FIGURE A-H-1—SAMPLE FORMAT
HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP) INSTRUCTIONS

SECTION I—FACILITY DESCRIPTION

1.1 Part A

1. *Fill out Items 1 through 11 and sign the declaration.*
2. *Only Part A of this section is required to be updated and submitted annually, or within 30 days of a change.*

1. 2 Part B—General Facility Description (Site Plan)

1. *Provide a site plan on 8 $^1/_2$-by 11-inch (215 mm by 279 mm) paper, using letters on the top and bottom margins and numbers on the right and left side margins, showing the location of all buildings, structures, chemical loading areas, parking lots, internal roads, storm and sanitary sewers, wells, and adjacent property uses. Indicate the approximate scale, northern direction and date the drawing was completed.*
2 *List all special land uses within 1 mile (1.609 km).*

1.3 Part C—Facility Storage Map (Confidential Information)

1. *Provide a floor plan of each building on 8 $^1/_2$ by 11-inch (215 mm by 279 mm) paper, using letters on the top and bottom margins and numbers on the right and left side margins, with approximate scale and northern direction, showing the location of each storage area. Mark map clearly "Confidential—Do not disclose" for trade-secret information as specified by federal, state and local laws.*
2. *Identify each storage area with an identification number, letter, name or symbol.*
3. *Show the following:*
    - *3.1. Accesses to each storage area.*
    - *3.2. Location of emergency equipment.*
    - *3.3. The general purpose of other areas within the facility.*
    - *3.4. Location of all aboveground and underground tanks to include sumps, vaults, below-grade treatment systems, piping, etc.*

4. *Map key. Provide the following on the map or in a map key or legend for each storage area:*
   - 4.1. *A list of hazardous materials, including wastes.*
   - 4.2. *Hazard class of each hazardous waste.*
   - 4.3. *The maximum quantity for hazardous materials.*
   - 4.4. *Include the contents and capacity limit of all tanks at each area and indicate whether they are above or below ground.*
   - 4.5. *List separately any radioactives, cryogens and compressed gases for each facility.*
   - 4.6. *Trade-secret information shall be listed as specified by federal, state and local laws.*

SECTION II—HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS)

2.1 Part A—Declaration

Fill out all appropriate information.

2.2 Part B—Inventory Statement

1. *You must complete a separate inventory statement for all waste and nonwaste hazardous materials. List all hazardous materials in alphabetical order by hazard class.*

2. ***Inventory Statement Instructions:***

Column Information Required

1. *Provide hazard class for each material.*
2. *Nonwaste. Provide the common or trade name of the regulated material. Waste. In lieu of trade names, you may provide the waste category.*
3. *Provide the chemical name and major constituents and concentrations, if a mixture.*
4. *Enter the chemical abstract service number (CAS number) found in 29 C.F.R. For mixtures, enter the CAS number of the mixture as a whole if it has been assigned a number distinct from its constituents. For a mixture that has no CAS number, leave this item blank or report the CAS numbers of as many constituent chemicals as possible.*
5. *Enter the following descriptive codes as they apply to each material. You may list more than one code, if applicable.*
   - *P = Pure*
   - *M = Mixture*
   - *S = Solid*
   - *L = Liquid*
   - *G = Gas*
6. *Provide the maximum aggregate quantity of each material handled at any one time by the business. For underground tanks, list the maximum volume [in gallons (liters)] of the tank.*
   - 6.1. *Enter the estimated average daily amount on site during the past year.*
7. *Enter the units used in Column 6 as:*
   - *LB = Pounds*
   - *GA = Gallons*
   - *CF = Cubic Feet*
8. *Enter the number of days that the material was present on site (during the last year).*
9. *Enter the storage codes below for type, temperature and pressure.*

   Type
   - *A = Aboveground Tank*
   - *B = Belowground Tank*
   - *C = Tank inside Building*
   - *D = Steel Drum*
   - *E = Plastic or Nonmetallic Drum*
   - *F = Can*
   - *G = Carbon*
   - *H = Silo*
   - *I = Fiber Drum*
   - *J = Bag*
   - *K = Box*
   - *L = Cylinder*
   - *M = Glass Bottle or Jug*
   - *N = Plastic Bottles or Jugs*
   - *O = Tote Bin*
   - *P = Tank Wagon*

Q = Rail Car
R = Other

Temperature

4 = Ambient
5 = Greater than Ambient
6 = Less than Ambient, but not Cryogenic [less than -150°F (-101.1°C)]
7 = Cryogenic conditions [less than -150°F (-101.1°C)]

Pressure

1 = Ambient (Atmospheric)
2 = Greater than Ambient (Atmospheric)
3 = Less than Ambient (Atmospheric)

10. *For each material listed, provide the Superfund Amendments and Reauthorization Act (SARA) hazard class as listed below. You may list more than one class. These categories are defined in 40 C.F.R. 370.3.*

Physical Hazards

F = Fire
P = Sudden Release of Pressure
R = Reactivity

Health Hazards

I = Immediate (Acute)
D = Delayed (Chronic)

11. ***Waste Only.*** *For each waste, provide the total estimated amount of hazardous waste handled throughout the course of the year.*

SECTION III—SEPARATION AND MONITORING

3.1 Part A—Aboveground

Fill out Items 1 through 6, or provide similar information for each storage area shown on the facility map. Use additional sheets as necessary.

3.2 Part B—Underground

1. *Complete a separate page for each underground tank, sump, vault, below-grade treatment system, etc.*
2. *Check the type of tank and method(s) that applies to your tank(s) and piping, and answer the appropriate questions. Provide any additional information in the space provided or on a separate sheet.*

SECTION IV—WASTE DISPOSAL

Check all that apply and list the associated wastes for each method checked.

SECTION V—RECORDING KEEPING

Include a brief description of your inspection procedures. You are also required to keep an inspection log and recordable discharge log, which are designed to be used in conjunction with routine inspections for all storage facilities or areas. Place a check in each box that describes your forms. If you do not use the sample forms, provide copies of your forms for review and approval.

SECTION VI—EMERGENCY-RESPONSE PLAN

1. *This plan should describe the personnel, procedures and equipment available for responding to a release or threatened release of hazardous materials that are stored, handled or used on site.*
2. *A check or a response under each item indicates that a specific procedure is followed at the facility, or that the equipment specified is maintained on site.*
3. *If the facility maintains a more detailed emergency-response plan on site, indicate this in Item 5. This plan shall be made available for review by the inspecting jurisdiction.*

SECTION VII—EMERGENCY RESPONSE TRAINING PLAN

1. *This plan should describe the basic training plan used at the facility.*
2. *A check in the appropriate box indicates the training is provided or the records are maintained.*
3. *If the facility maintains a more detailed emergency-response training plan, indicate this in Item 4. This plan shall be made available for review by the inspecting jurisdiction.*

FIGURE A-H-1—HAZARDOUS MATERIALS MANAGEMENT PLAN
SECTION I: FACILITY DESCRIPTION

PART A—GENERAL INFORMATION

1. *Business Name:* _____ *Phone:*_____
   Address: _____

2. *Person Responsible for the Business*

Name:	***Title:***	***Phone:***
_____	_____	_____

3. *Emergency Contacts:*

Name:	***Title:***	***Home Number:***	***Work Number:***
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. *Person Responsible for the Application/Principal Contact:*

Name:	***Title:***	***Phone:***
_____	_____	_____

5. *Property Owner:*

Name:	***Address:***	***Phone:***
_____	_____	_____

6. *Principal Business Activity:*_____
7. *Number of Employees:*_____
8. *Number of Shifts:* _____
9. *Hours of Operation:* _____
10. *SIC Code:* _____
11. *Dunn and Bradstreet Number:* _____
12. *Declaration*_____

I certify that the information above and on the following parts is true and correct to the best of my knowledge.

Signature: _____*Date:* _____

Print Name: _____*Title:* _____

(Must be signed by owner/operator or designated representative)

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PART B—GENERAL FACILITY DESCRIPTION/SITE PLAN

(Use grid format on next page.)

Special land uses within 1 mile (1.609 km):_____

_____

_____

PART C—FACILITY MAP

(Use grid format below.)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1															1
2															2
3															3
4															4
5															5
6															6
7															7
8															8
9															9
10															10
11															11
12															12
13															13
14															14
15															15
16															16
17															17
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	

BUSINESS NAME	DATE
ADDRESS CITY	PAGE_____ OF_____

(Use grid format above)

SECTION II: HAZARDOUS MATERIALS INVENTORY STATEMENT

PART A—DECLARATION

1. Business Name: _____

2. Address: _____

3. Declaration:

Under penalty of perjury, I declare the above and subsequent information, provided as part of the hazardous materials inventory statement, is true and correct.

Signature: _____Date: _____

Print Name: _____Title: _____

(Must be signed by owner/operator or designated representative)

FIGURE A-II-E-1—(Continued)
PART B—HAZARDOUS MATERIALS INVENTORY STATEMENT

(1) HAZARD CLASS	(2) COMMON/ TRADE NAME	(3) CHEMICAL NAME, COMPONENTS AND CONCENTRATION	(4) CHEMICAL ABSTRACT SERVICE NO.	(5) PHYSICAL STATE	(6) MAXIMUM QUANTITY ON HAND AT ANY TIME	(7) UNITS	(8) DAYS ON SITE	(9) STORAGE CODE (TYPE, PRES., TEMP.)	(10) SARA CLASS	(11) ANNUAL WASTE THROUGHPUT

SECTION III: SEPARATION, SECONDARY CONTAINMENT AND MONITORING
PART A—ABOVEGROUND STORAGE AREAS

*Storage Area Identification (as shown on facility map):*_____

1. Storage Type:

_____ *Original Containers* _____ *Safety Cans*

_____ *Inside Machinery* _____ *Bulk Tank*

_____ *55-gallon (208.2 L) Drums or Storage Shed* _____ *Outside Barrels*

_____ *Pressurized Vessel*

_____ *Other:* _____

_____

_____*2.*

Storage Location:

_____ *Inside Building* _____ *Outside Building*

_____ *Secured*

3. Separation:

_____ *All Materials* _____ *One-hour Separation*

_____ *Compatible Wall/Partition*

_____ *Separated by 20 Feet (6096 mm)* _____ *Approved Cabinets*

_____ *Other:* _____

_____

_____*4.*

Secondary Containment:

_____ *Approved Cabinet* _____ *Secondary Drums*

_____ *Tray* _____ *Bermed, Coated Floor*

_____ *Vaulted Tank* _____ *Double-wall Tank*

_____ *Other:* _____

_____

_____*5.*

Monitoring:

_____ *Visual* _____ *Continuous*

_____*Other:* _____

_____

_____*Att ach specifications if necessary*

6. Monitoring Frequency:

_____ *Daily* _____ *Weekly*

_____ *Other:* _____

Attach specifications if necessary

APPENDIX H

FIGURE A-II-E-1—(Continued)

SECTION III: SEPARATION, CONTAINMENT AND MONITORING

PART B—UNDERGROUND

SINGLE-WALL TANKS AND PIPING

Tank Area Identification (as shown on facility map): _____

1. _____ Backfill Vapor Wells

Model and Manufacturer:

_____Co

ntinuous or Monthly Testing: _____

2. _____ Groundwater Monitoring Wells

3. _____ Monthly Precision Tank Test

4. _____ Piping—

Monitoring Method: _____

Frequency: _____

5. _____ Other: _____

DOUBLE-WALL TANKS AND PIPING

Tank Area Identification (as shown on facility map):_____

1. Method of monitoring the annular space: _____

2. Frequency:

_____ Continuous _____ Daily _____ Weekly

_____ Other: _____

3. List the type of secondary containment for piping: _____

_____

4. List the method of monitoring the secondary containment for piping: _____

5. Are there incompatible materials within the same vault?

_____ Yes _____ No

If yes, how is separate secondary containment provided?_____

_____

Note: *If you have continuous monitoring equipment, you shall maintain copies of all service and maintenance work. Such reports shall be made available for review on site, and shall be submitted to the fire prevention bureau upon request.*

Attach additional sheets as necessary.

SECTION IV: WASTE DISPOSAL

_____ Discharge to the Sanitary Sewer—Wastes: _____

_____ Pretreatment—Wastes: _____

_____Li

censed Waste Hauler _____Recycle _____

Wastes: _____Wastes: _____

_____

_____

_____ Other—

Describe Method: _____

Wastes: _____

_____ No Waste

APPENDIX H

FIGURE A-II-E-1—(Continued)

SECTION IV: WASTE DISPOSAL—continued

B. Spill Containment:

_____ *Absorbents* _____ *Other:* _____

C. Spill Control and Treatment:

_____ *Vapor Scrubber* _____ *Mechanical Ventilation*

_____ *Pumps/vacuums* _____ *Secondary Containment*

_____ *Neutralizer* _____ *Other:* _____

4. Evacuation:

_____ *Immediate area evacuation routes posted*

_____ *Entire building evacuation procedures developed*

_____ *Assembly areas preplanned*

_____ *Evacuation maps posted*

_____ *Other:* _____

_____

5. Supplemental hazardous materials emergency response plan on site.

*Location:*_____

Responsible Person: _____

*Phone:*_____

SECTION V: RECORD KEEPING

Description of our inspection program: _____

_____

_____

_____ *We will use the attached sample forms in our inspection program.*

_____ *We will not use the sample forms. We have attached a copy of our own forms.*

SECTION VI: EMERGENCY RESPONSE PLAN

1. In the event of an emergency, the following shall be notified:

A. On-site Responders:

Name:	***Title:***	***Home Number:***
_____	_____	_____
_____	_____	_____

B. Method of Notification to Responder:

_____ *Automatic Alarm* _____ *Phone*

_____ *Manual Alarm* _____ *Verbal*

_____ *Other:* _____

_____ _____

C. ***Agency:*** ***Phone Number:***
Fire Department:
California Emergency Management Agency (Cal EMA):
Other:

_____

_____

2. Designated Local Emergency Medical Facility:

Name: ***Address:*** ***Phone (24 hours):***

_____ _____ _____

3. Mitigation Equipment:
A. Monitoring Devices:
_____ *Toxic or flammable gas detection*
_____ *Fluid detection*
_____ *Other:*_____

_____

SECTION VII: EMERGENCY-RESPONSE TRAINING PLAN

1. Person responsible for the emergency-response training plan:

Name: ***Title:*** ***Phone:***

_____ _____ _____

2. Training Requirements:
A. All employees trained in the following as indicated:
_____ *Procedures for internal alarm/notification*
_____ *Procedures for notification of external emergency-response organization*
_____ *Location and content of the emergency-response plan*
B. Chemical handlers are trained in the following as indicated:
_____ *Safe methods for handling and storage of hazardous materials*
_____ *Proper use of personal protective equipment*
_____ *Locations and proper use of fire- and spill-control equipment*
_____ *Specific hazards of each chemical to which they may be exposed*
C. Emergency-response team members are trained in the following:
_____ *Procedures for shutdown of operations*
_____ *Procedures for using, maintaining and replacing facility emergency and monitoring equipment*
3. The following records are maintained for all employees:
_____ *Verification that training was completed by the employee*
_____ *Description of the type and amount of introductory and continuing training*
_____ *Documentation on and description of emergency-response drills conducted at the facility*

4. A more comprehensive and detailed emergency-response training plan is maintained on site.

Location: _____

Responsible Person: _____

Phone: _____

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX I – FIRE PROTECTION SYSTEMS—NONCOMPLIANT CONDITIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX I

FIRE PROTECTION SYSTEMS—NONCOMPLIANT CONDITIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix I, which was developed by the ICC Hazard Abatement in Existing Buildings Committee, is intended to provide the fire code official with a list of conditions that are readily identifiable by the inspector during the course of an inspection utilizing this code. The specific conditions identified in this appendix are primarily derived from applicable NFPA standards and pose a hazard to the proper operation of the respective systems. While these do not represent all of the conditions that pose a hazard or otherwise may impair the proper operation of fire protection systems, their identification in this adoptable appendix will provide a more direct path for enforcement by the fire code official.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION I101—NONCOMPLIANT CONDITIONS

I101.1 General. This appendix is intended to identify conditions that can occur where fire protection systems are not properly maintained or components have been damaged. This appendix is not intended to provide comprehensive inspection, testing and maintenance requirements, which are found in NFPA 10, NFPA 25 and NFPA 72. Rather, it is intended to identify problems that are readily observable during fire inspections.

I101.2 Impaired conditions requiring immediate action. The following conditions indicate noncompliant and impaired fire protection systems. An impaired system(s) shall require immediate action by the building owner to return the fire protection system back to service:

1. Valves in the shut or closed position:
    - 1.1. Water supply valves, such as in riser rooms, yards and vaults.
    - 1.2. Water supply floor control valves in multiple-story buildings.
    - 1.3. Fuel supply valves for fire pumps.
    - 1.4. Commercial kitchen hood suppression valves.
2. Impaired fire alarm systems:
    - 2.1. Fire alarm systems with no power (primary or secondary).
    - 2.2. No active communication path to the supervising/remote station (unless the system is local).

I101.3 Noncompliant conditions requiring component replacement. The following conditions shall be deemed noncompliant and shall cause the related component(s) to be replaced to comply with the provisions of this code:

1. Sprinklers having any of the following conditions:
    - 1.1. Signs of leakage.
    - 1.2. Paint or other ornamentation that is not factory applied.
    - 1.3. Evidence of corrosion including, but not limited to, discoloration or rust.
    - 1.4. Deformation or damage of any part.
    - 1.5. Improper orientation of sprinkler.
    - 1.6. Empty glass bulb.
    - 1.7. Sprinklers manufactured prior to 1920.
    - 1.8. Replacement sprinklers that do not match existing sprinklers in orifice size, K-factor temperature rating, coating or deflector type.
    - 1.9. Sprinklers for the protection of cooking equipment that have not been replaced within one year.
2. Water pressure and air pressure gauges.
    - 2.1. Installed for more than 5 years and have not been tested to within 3 percent accuracy.
    - 2.2. Indicating zero pressure.

I101.4 Noncompliant conditions requiring component repair or replacement. The following shall be deemed noncompliant conditions and shall cause the related component(s) to be repaired or replaced to comply with the provisions of this code:

1. Sprinkler and standpipe system piping and fittings having any of the following conditions:
    - 1.1. Signs of leakage.
    - 1.2. Evidence of corrosion.
    - 1.3. Misalignment.
    - 1.4. Mechanical damage.

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2. Sprinkler piping support having any of the following conditions:
    2.1. Materials resting on or hung from sprinkler piping.
    2.2. Damaged or loose hangers or braces.
3. Class II and Class III standpipe systems having any of the following conditions:
    3.1. No hose or nozzle, where required.
    3.2. Hose threads incompatible with fire department hose threads.
    3.3. Hose connection cap missing.
    3.4. Mildew, cuts, abrasions and deterioration evident.
    3.5. Coupling damaged.
    3.6. Gaskets missing or deteriorated.
    3.7. Nozzle missing or obstructed.
4. Hose racks and cabinets having any of the following conditions:
    4.1. Difficult to operate or damaged.
    4.2. Hose improperly racked or rolled.
    4.3. Inability of rack to swing 90 degrees (1.57 rad) out of the cabinet.
    4.4. Cabinet locked, except as permitted by this code.
    4.5. Cabinet door will not fully open.
    4.6. Door glazing cracked or broken.
5. Portable fire extinguishers having any of the following conditions:
    5.1. Broken seal or tamper indicator.
    5.2. Expired maintenance tag.
    5.3. Pressure gauge indicator in “red.”
    5.4. Signs of leakage or corrosion.
    5.5. Mechanical damage, denting or abrasion of tank.
    5.6. Presence of repairs such as welding, soldering or brazing.
    5.7. Damaged threads.
    5.8. Damaged hose assembly, couplings or swivel joints.
6. Fire alarm and detection control equipment, initiating devices and notification appliances having any of the following conditions:
    6.1. Corroded or leaking batteries or terminals.
    6.2. Smoke detectors having paint or other ornamentation that is not factory applied.
    6.3. Mechanical damage to any fire alarm equipment, devices or appliances.
    6.4. Tripped fuses.
    6.5. Fire alarm systems not in “normal” (no alarm, supervisory or trouble) state.
7. Fire department connections having any of the following conditions:
    7.1. Fire department connections are not visible or able to be accessed from the fire apparatus access road.
    7.2. Couplings or swivels are damaged.
    7.3. Plugs and caps are missing or damaged.
    7.4. Gaskets are deteriorated.
    7.5. Check valve is leaking.
    7.6. Identification signs are missing.
8. Fire pumps having any of the following conditions:
    8.1. Pump room temperature is less than 40°F (4.4°C).
    8.2. Ventilating louvers are not freely operable.
    8.3. Corroded or leaking system piping.
    8.4. Diesel fuel tank is less than two-thirds full.
    8.5. Battery readings, lubrication oil or cooling water levels are abnormal.

SECTION I102—REFERENCED STANDARDS

I102.1 General. See Table I102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE I102.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
NFPA 10—22	*Portable Fire Extinguishers*	I101.1
NFPA 25—23	*Inspection, Testing and Maintenance of Water-based Fire Protection Systems*	I101.1
NFPA 72—22	*National Fire Alarm and Signaling Code*	I101.1

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX J – BUILDING INFORMATION SIGN

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

J BUILDING INFORMATION SIGN

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix:	Appendix J provides design, installation and maintenance requirements for a Building Information Sign (BIS), a fire service tool to be utilized in the crucial, initial response of firefighters to a structure fire. The BIS placard is designed to be utilized within the initial response time frame of an incident to assist firefighters in their tactical sizing up of a situation as soon as possible after arrival on the scene of a fire emergency. The BIS design is in the shape of a fire service Maltese Cross and includes five spaces (the four wings plus the centerpiece of the cross symbol) in which information is placed about the tactical considerations of construction type and hourly rating, fire protection systems, occupancy type, content hazards and special features that could affect tactical decisions and operations.
ICC code development note:	Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION J101—GENERAL

J101.1 Scope. New buildings shall have a building information sign(s) that shall comply with Sections J101.1.1 through J101.7. Existing buildings shall be brought into conformance with Sections J101.1 through J101.9 when one of the following occurs:

1. The fire department conducts an annual inspection intended to verify compliance with this section, or any required inspection.
2. A change in use or occupancy has occurred.

Exceptions:

1. Group U occupancies.
2. One- and two-family dwellings.

J101.1.1 Sign location. The building information sign shall be placed at one of the following locations:

1. On the entry door or sidelight at a minimum height of 42 inches (1067 mm) above the walking surface on the address side of the building or structure.
2. On the exterior surface of the building or structure on either side of the entry door, not more than 3 feet (76 mm) from the entrance door, at a minimum height of 42 inches (1067 mm) above the walking surface on the address side of the building or structure.
3. Conspicuously placed inside an enclosed entrance lobby, on any vertical surface within 10 feet (254 mm) of the entrance door at a minimum height of 42 inches (1067 mm) above the walking surface.
4. Inside the building's fire command center.
5. On the exterior of the fire alarm control unit or on the wall immediately adjacent to the fire alarm control unit door where the alarm panel is located in the enclosed main lobby.

J101.1.2 Sign features. The building information sign shall consist of all of the following:

1. White reflective background with red letters.
2. Durable material.
3. Numerals shall be Roman or Latin numerals, as required, or alphabet letters.
4. Permanently affixed to the building or structure in an approved manner.

J101.1.3 Sign shape. The building information sign shall be a Maltese cross as shown in Figure J101.1.3.

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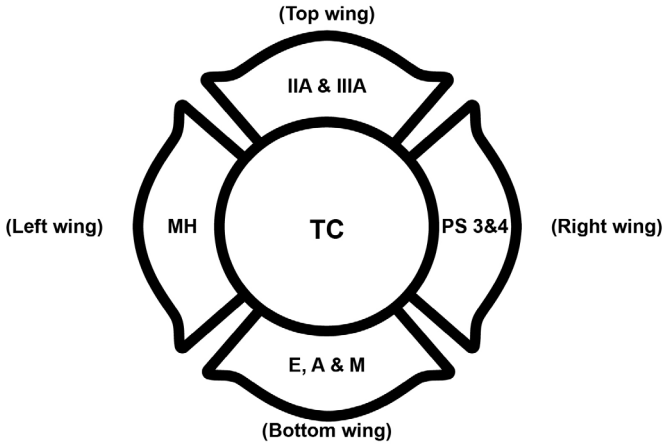
FIGURE J101.1.3—EXAMPLE OF COMPLETED BUILDING INFORMATION SIGN



J101.1.4 Sign size and lettering. The minimum size of the building information sign and lettering shall be in accordance with the following:

1. The width and height shall be 6 inches by 6 inches (152 mm by 152 mm).
2. The height or width of each Maltese cross wing area shall be $1^1/_8$ inches (29 mm) and have a stroke width of $^1/_2$ inch (12.7 mm).
3. The center of the Maltese cross, a circle or oval, shall be 3 inches (76 mm) in diameter and have a stroke width of $^1/_2$ inch (12.7 mm).
4. All Roman numerals and alphabetic designations, shall be $1^1/_4$ inches (32 mm) in height and have a stroke width of $^1/_4$ inch (6.4 mm).

J101.2 Sign designations. Designations shall be made based on the construction type, content, hazard, fire protection systems, life safety and occupancy. Where multiple designations occur within a classification category, the designation used shall be based on the greatest potential risk.

J101.3 Construction type (top wing). The construction types shall be designated by assigning the appropriate Roman numeral, and letter, placed inside the top wing of the Maltese cross. The hourly rating provided is for the structural framing in accordance with Table 601 of the *California Building Code*.

CONSTRUCTION TYPE	FIRE-RESISTANCE RATING
IA—Noncombustible	3 hours
IB—Noncombustible	2 hours
IIA—Noncombustible	1 hour
IIB—Noncombustible	0 hours
IIIA—Noncombustible/combustible	1 hour
IIIB—Noncombustible/combustible	0 hours
IV—Heavy timber (HT)	HT
VA—Combustible	1 hour
VB—Combustible	0 hours

J101.4 Fire protection systems (right wing). The fire protection system shall be designated by determining its level of protection and assigning the appropriate designation to the right wing of the Maltese cross. Where multiple systems are provided, all shall be listed:

AS Automatic sprinkler system installed throughout

CES Chemical extinguishing system and designated area

CS Combination sprinkler and standpipe system

DS Dry sprinkler system and designated areas

FA Fire alarm system

FP Fire pump

FW Fire wall and designated areas

PAS Pre-action sprinkler system and designated floor

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PS Partial automatic sprinkler system, and designated floor

S Standpipe system

NS No system installed

J101.5 Occupancy type (bottom wing). The occupancy of a building or structure shall be designated in accordance with the occupancy classification found in Section 302.1 of the *California Building Code* and the corresponding designation shall be placed in the bottom wing of the Maltese cross. Where a building or structure contains a mixture of uses and occupancies, all uses and occupancies shall be identified.

A Assembly

B Business

E Educational

F Factory or Industrial

H High Hazard

I Institutional

M Mercantile

R Residential

J101.6 Hazards of content (left wing). The hazards of building contents shall be designated by one of the following classifications as defined in NFPA 13 and the appropriate designation shall be placed inside the left wing of the Maltese cross:

LH Light hazard

MH Moderate hazard

HH High hazard

J101.7 Tactical considerations (center circle). The center circle shall include the name of the local fire service and, where required, the letters "TC" for "tactical considerations." Where firefighters conduct preplan operations, a unique situation(s) for tactical considerations shall be identified and the information provided to the fire dispatch communications center to further assist firefighters in identifying that there is special consideration(s) for this occupancy. Special consideration designations include, but are not limited to:

1. Impact-resistant drywall.
2. Impact-resistant glazing, such as blast or hurricane-type glass.
3. All types of roof and floor structural members including but not limited to post-tension concrete, bar joists, solid wood joists, rafters, trusses, cold-formed galvanized steel, I-joists and I-beams; green roof with vegetation, soil and plants.
4. Hazardous materials (such as explosives, chemicals, plastics).
5. Solar panels and DC electrical energy.
6. HVAC system; and smoke management system for pressurization and exhaust methods.
7. Other unique characteristic(s) within the building that are ranked according to a potential risk to occupants and firefighters.

J101.8 Sign classification maintenance, building information. Sign maintenance shall comply with each of the following:

1. Fire departments in the jurisdiction shall define the designations to be placed within the sign.
2. Fire departments in the jurisdiction shall conduct annual inspections to verify compliance with this section of the code and shall notify the owner, or the owner's agent, of any required updates to the sign in accordance with fire department designations and the owner, or the owner's agent, shall comply within 30 days.
3. The owner of a building shall be responsible for the maintenance and updates to the sign in accordance with fire department designations.

J101.9 Training. Jurisdictions shall train fire department personnel on Sections J101.1 through J101.8.

SECTION J102—REFERENCED STANDARDS

J102.1 General. See Table J102.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE J102.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CBC—25	*California Building Code*	J101.3, J101.5
NFPA 13—22	*Installation of Sprinkler Systems*	J101.6

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX K – CONSTRUCTION REQUIREMENTS FOR EXISTING AMBULATORY CARE FACILITIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

K

CONSTRUCTION REQUIREMENTS FOR EXISTING AMBULATORY CARE FACILITIES

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix K was created with the intent to provide jurisdictions with an option for assessing minimum fire and life safety requirements for buildings containing ambulatory care facilities. While this appendix is written with the intent to apply retroactive minimum standards, it is recognized that the ambulatory care requirements are relatively recent additions to the *California Building Code*. For that reason, these requirements are presented as an appendix so that the adopting authority can exercise judgment in the adoption and application of this section. This appendix would also be useful for those local and state jurisdictions that are specifically focused on ensuring the safety of existing ambulatory care facilities by providing minimum criteria that could be used to bring older facilities into compliance with the current standards at the discretion of the adopting jurisdiction. The technical requirements are based on the current *California Building Code* language, which is consistent with the overall concept of the current federal requirements.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION K101—GENERAL

K101.1 Scope. The provisions of this chapter shall apply to existing buildings containing ambulatory care facilities in addition to the requirements of Chapter 11. Where the provisions of this chapter conflict with either the construction requirements in Chapter 11 or the construction requirements that applied at the time of construction, the most restrictive provision shall apply.

K101.2 Intent. The intent of this appendix is to provide a minimum degree of fire and life safety to persons occupying and existing buildings containing ambulatory care facilities where such buildings do not comply with the minimum requirements of the *California Building Code*.

SECTION K102—FIRE SAFETY REQUIREMENTS FOR EXISTING AMBULATORY CARE FACILITIES

K102.1 Separation. Ambulatory care facilities where the potential exists for four or more care recipients to be incapable of self-preservation at any time, whether rendered incapable by staff or staff has accepted responsibility for a care recipient already incapable, shall be separated from adjacent spaces, corridors or tenants with a fire partition installed in accordance with Section 708 of the *California Building Code*.

K102.2 Smoke compartments. Where the aggregate area of one or more ambulatory care facilities is greater than 10,000 square feet (929 m^2) on one story, the story shall be provided with a smoke barrier to subdivide the story into not fewer than two smoke compartments. The area of any one such smoke compartment shall be not greater than 22,500 square feet (2092 m^2). The travel distance from any point in a smoke compartment to a smoke barrier door shall be not greater than 200 feet (60 960 mm). The smoke barrier shall be installed in accordance with Section 709 of the *California Building Code* with the exception that smoke barriers shall be continuous from an outside wall to an outside wall, a floor to a floor, or from a smoke barrier to a smoke barrier or a combination thereof.

K102.2.1 Refuge area. Not less than 30 net square feet (2.8 m^2) for each nonambulatory care recipient shall be provided within the aggregate area of corridors, care recipient rooms, treatment rooms, lounge or dining areas and other low-hazard areas within each smoke compartment. Each occupant of an ambulatory care facility shall be provided with access to a refuge area without passing through or utilizing adjacent tenant spaces.

K102.2.2 Smoke barriers. Smoke barriers shall be constructed in accordance with Sections 422 and 709 of the *California Building Code*.

Exceptions:

1. Smoke barriers shall be permitted to terminate at an atrium enclosure in accordance with Section 404.6 of the *California Building Code*.
2. *Smoke barriers* shall be continuous from an outside wall to an outside wall, a floor to a floor, a smoke barrier to a smoke barrier or a combination thereof.

K102.2.3 Opening protectives. Openings in smoke barriers shall be protected in accordance with Section 716 of the *California Building Code*. Opening protectives shall have a minimum fire protection rating of $^1/_3$ hour.

Exception: Existing wired glass vision panels in doors shall be permitted to remain.

K102.2.4 Penetrations. Penetrations of smoke barriers shall comply with the *California Building Code*.

Exception: Approved existing materials and methods of construction.

K102.2.5 Joints. Joints made in or between smoke barriers shall comply with the *California Building Code*.

Exception: Approved existing materials and methods of construction.

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K102.2.6 Duct and air transfer openings. Penetrations in a *smoke barrier* by duct and air-transfer openings shall comply with Section 717 of the *California Building Code*.

Exception: Where existing duct and air-transfer openings in smoke barriers exist without smoke dampers, they shall be permitted to remain. Any changes to existing smoke dampers shall be submitted for review and approved in accordance with Section 717 of the *California Building Code*.

K102.2.7 Independent egress. A means of egress shall be provided from each smoke compartment created by smoke barriers without having to return through the smoke compartment from which means of egress originated.

K102.3 Automatic sprinkler system. An automatic sprinkler system shall be provided in ambulatory care facilities where required by Sections K102.3.1 and K102.3.2.

K102.3.1 Types IIB, IIIB and VB construction. An automatic sprinkler system shall be provided throughout the entire floor containing an ambulatory care facility in Type IIB, IIIB and VB construction where either of the following conditions exist at any time:

1. Four or more care recipients are rendered incapable of self-preservation.
2. One or more care recipients that are rendered incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided, all floors below and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

K102.3.2 High-rise buildings. In high-rise buildings containing ambulatory care facilities, an automatic sprinkler system shall be provided throughout the entire floor containing an ambulatory care facility where either of the following conditions exist at any time:

1. Four or more care recipients are rendered incapable of self-preservation.
2. One or more care recipients that are rendered incapable of self-preservation are located at other than the level of exit discharge serving such a facility.

In buildings where ambulatory care is provided on levels other than the level of exit discharge, an automatic sprinkler system shall be installed throughout the entire floor where such care is provided, all floors below and all floors between the level of ambulatory care and the nearest level of exit discharge, including the level of exit discharge.

K102.4 Automatic fire alarm system. Fire areas containing ambulatory care facilities shall be provided with an electronically supervised automatic smoke detection system installed within the ambulatory care facility and in public use areas outside of tenant spaces, including public corridors and elevator lobbies.

Exception: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, provided that the occupant notification appliances will activate throughout the notification zones upon sprinkler waterflow.

K102.5 Waste and linen chutes. In ambulatory care facilities, existing waste and linen chutes shall comply with Sections K102.5.1 through K102.5.5.

K102.5.1 Enclosures. Chutes shall be enclosed with 1- hour *fire-resistance-rated* construction. Opening protectives shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

K102.5.2 Chute intakes. Chute intakes shall comply with Section K102.5.2.1 or K102.5.2.2.

K102.5.2.1 Chute intake direct from corridor. Where intake to chutes is direct from a *corridor*, the intake opening shall be equipped with a chute-intake door in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

K102.5.2.2 Chute intake via a chute-intake room. Where the intake to chutes is accessed through a chute-intake room, the room shall be enclosed with 1-hour fire-resistance-rated construction. Opening protectives for the intake room shall be in accordance with Section 716 of the *California Building Code* and have a *fire protection rating* of not less than $^{3}/_{4}$ hour. Opening protectives for the chute enclosure shall be in accordance with Section K102.5.1.

K102.5.3 Automatic sprinkler system. Chutes shall be equipped with an approved automatic sprinkler system in accordance with Section 903.2.11.2.

K102.5.4 Chute discharge rooms. Chutes shall terminate in a dedicated chute discharge room. Such rooms shall be separated from the remainder of the building by not less than 1-hour fire-resistance-rated construction. Opening protectives shall be in accordance with Section 716 of the *California Building Code* and have a fire protection rating of not less than 1 hour.

K102.5.5 Chute discharge protection. Chute discharges shall be equipped with a self-closing or automatic-closing opening protective in accordance with Section 716 of the *California Building Code* and have a *fire protection rating* of not less than 1 hour.

SECTION K103—INCIDENTAL USES IN EXISTING AMBULATORY CARE FACILITIES

K103.1 General. Incidental uses associated with and located within existing ambulatory care facilities required to be separated by Section 422 in the *California Building Code*, and that generally pose a greater level of risk to such occupancies, shall comply with the

provisions of Sections K103.2 through K103.4.2.1. Incidental uses in ambulatory care facilities required to be separated by Section 422 of the *California Building Code* are limited to those listed in Table K103.1.

TABLE K103.1—INCIDENTAL USES IN EXISTING AMBULATORY CARE FACILITIES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Furnace room where any piece of equipment is over 400,000 Btu per hour input	1 hour or provide automatic sprinkler system
Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower	1 hour or provide automatic sprinkler system
Refrigerant machinery room	1 hour or provide automatic sprinkler system
Hydrogen fuel gas rooms, not classified as Group H	1 hour in ambulatory care facilities
Incinerator rooms	2 hours and provide automatic sprinkler system
Laboratories not classified as Group H	1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet	1 hour or provide automatic sprinkler system
Waste and linen collection rooms with containers with total volume of 10 cubic feet or greater	1 hour or provide automatic sprinkler system
Storage rooms greater than 100 square feet	1 hour or provide automatic sprinkler system
Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons for flooded lead-acid, nickel cadmium or VRLA, or more than 1,000 pounds for lithium-ion and lithium metal polymer used for facility standby power, emergency power or uninterruptible power supplies	1 hour in ambulatory care facilities

For SI: 1 square foot = 0.0929 m^2, 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

K103.2 Occupancy classification. Incidental uses shall not be individually classified in accordance with Section 302.1 of the *California Building Code*. Incidental uses shall be included in the building occupancies in which they are located.

K103.3 Area limitations. Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.

K103.4 Separation and protection. The incidental uses listed in Table K103.1 shall be separated from the remainder of the building or equipped with an automatic sprinkler system, or both, in accordance with the provisions of that table.

K103.4.1 Separation. Where Table K103.1 specifies a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building in accordance with Section 509.4.1 of the *California Building Code*.

K103.4.2 Protection. Where Table K103.1 permits an automatic sprinkler system without a fire-resistance-rated separation, the incidental uses shall be separated from the remainder of the building by construction capable of resisting the passage of smoke in accordance with Section 509.4.2 of the *California Building Code*.

K103.4.2.1 Protection limitation. Except as otherwise specified in Table K103.1 for certain incidental uses, where an automatic sprinkler system is provided in accordance with Table K103.1, only the space occupied by the incidental use need be equipped with such a system.

SECTION K104—MEANS OF EGRESS REQUIREMENTS FOR EXISTING AMBULATORY CARE FACILITIES

K104.1 Size of doors. The required capacity of each door opening shall be sufficient for the occupant load thereof and shall provide a minimum clear opening width of 28 inches (711 mm). Where this section requires a minimum clear opening width of 28 inches (711 mm) and a door opening includes two door leaves without a mullion, one leaf shall provide a minimum clear opening width of 28 inches (711 mm). In ambulatory care facilities, doors serving as means of egress from patient treatment rooms shall provide a minimum clear opening width of 32 inches (813 mm). The maximum width of a swinging door leaf shall be 48 inches (1219 mm) nominal. The minimum clear opening height of doors shall be 80 inches (2032 mm).

Exceptions:

1. Door openings to storage closets less than 10 square feet (0.93 m^2) in area shall not be limited by the minimum clear opening width.
2. The width of door leaves in revolving doors that comply with Section 1010.3.1 shall not be limited.
3. The maximum width of door leaves in revolving doors that comply with Section 1010.3.2 shall not be limited.
4. Exit access doors serving a room not larger than 70 square feet (6.5 m^2) shall have a door leaf width of not less than 24 inches (610 mm).
5. Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the floor.

K104.2 Corridor and aisle width. Corridor width shall be as determined in Section 1005.1 and this section. The minimum width of corridors and aisles that serve gurney traffic in areas where patients receive care that causes them to be incapable of self-preservation shall be not less than 72 inches (1829 mm).

K104.3 Existing elevators. Existing elevators, escalators, dumbwaiters and moving walks shall comply with the requirements of Sections K104.3.1 and K104.3.2.

K104.3.1 Elevators, escalators, dumbwaiters and moving walks. Existing elevators, escalators, dumbwaiters and moving walks in ambulatory care facilities required to be separated by Section 422 of the *California Building Code* shall comply with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

K104.3.2 Elevator emergency operation. Existing elevators with a travel distance of 25 feet (7620 mm) or more above or below the main floor or other level of a building and intended to serve the needs of emergency personnel for firefighting or rescue purposes shall be provided with emergency operation in accordance with *California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders.*

SECTION K105—REFERENCED STANDARDS

K105.1 General. See Table K105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE K105.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CBC—25	*California Building Code*	K101.2, K102.1, K102.2, K102.2.2, K102.2.3, K102.2.4, K102.2.5, K102.2.6, K102.5.1, K102.5.2.1, K102.5.2.2, K102.5.4, K102.5.5, K103.1, K103.2, K103.4.1, K103.4.2, K104.3.1
ASME A17.3—2023	*California Code of Regulations, Title 8, Division 1, Chapter 4, Subchapter 6, Elevator Safety Orders*	K104.3.1, K104.3.2

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX L – REQUIREMENTS FOR FIREFIGHTER AIR REPLENISHMENT SYSTEMS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

L REQUIREMENTS FOR FIREFIGHTER AIR REPLENISHMENT SYSTEMS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix:	Appendix L provides for the design, installation and maintenance of permanently installed firefighter breathing air systems in buildings designated by the jurisdiction. Breathing air is critical for firefighting operations. Historically, fire departments have supplied air bottles by means of a "bottle brigade," whereby firefighters manually transport air bottles up stairways, which is an extraordinarily firefighter-intensive process and takes firefighters away from their primary mission of rescue and firefighting. Technology now exists to address the issue using in-building air supply systems. Firefighter breathing air systems were introduced in the late 1980s and are now required in a number of communities throughout the United States. The system has been called a "standpipe for air" and consists of stainless steel, high-pressure piping that is supplied by on-site air storage or fire department air supply units. Air filling stations are then strategically located throughout the building, allowing firefighters to refill breathing air cylinders inside the fire building, negating the required "bottle brigade," and making more firefighters available for search, rescue and fire suppression operations.
ICC code development note:	Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION L101—GENERAL

L101.1 Scope. Firefighter air replenishment systems (FARS) shall be provided in accordance with this appendix. The adopting ordinance shall specify building characteristics or special hazards that establish thresholds triggering a requirement for the installation of a FARS. The requirement shall be based on the fire department's capability of replenishing firefighter breathing air during sustained emergency operations. Considerations shall include:

1. Building characteristics, such as number of stories above or below grade plane, floor area, type of construction and fire-resistance of the primary structural frame to allow sustained firefighting operations based on a rating of not less than 2 hours.
2. Special hazards, other than buildings, that require unique accommodations to allow the fire department to replenish firefighter breathing air.
3. Fire department staffing level.
4. Availability of a fire department breathing air replenishment vehicle.

SECTION L102—DEFINITIONS

L102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

FIREFIGHTER AIR REPLENISHMENT SYSTEM (FARS). A permanently installed arrangement of piping, valves, fittings and equipment to facilitate the replenishment of breathing air in self-contained breathing apparatus (SCBA) for firefighters engaged in emergency operations.

SECTION L103—PERMITS

L103.1 Permits. Permits shall be required to install and maintain a FARS. Permits shall be in accordance with Sections L103.2 and L103.3.

L103.2 Construction permit. A construction permit is required for installation of or modification to a FARS. The construction permit application shall include documentation of an acceptance and testing plan as specified in Section L105.

L103.3 Operational permit. An operational permit is required to maintain a FARS.

SECTION L104—DESIGN AND INSTALLATION

L104.1 Design and installation. A FARS shall be designed and installed in accordance with Sections L104.2 through L104.15.3.

L104.2 Standards. Firefighter air replenishment systems shall be in accordance with Sections L104.2.1 and L104.2.2.

L104.2.1 Pressurized system components. Pressurized system components shall be designed and installed in accordance with ASME B31.3.

L104.2.2 Air quality. The system shall be designed to convey breathing air complying with NFPA 1989.

L104.3 Design and operating pressure. The minimum design pressure shall be 110 percent of the fire department's normal SCBA fill pressure. The system design pressure shall be marked in an approved manner at the supply connections, and adjacent to pressure gauges on any fixed air supply components. Pressure shall be maintained in the system within 5 percent of the design pressure.

L104.4 Cylinder refill rate. The FARS shall be capable of refilling breathing air cylinders of a size and pressure used by the fire department at a rate of not less than two empty cylinders in 2 minutes.

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L104.5 Breathing air supply. Where a fire department mobile air unit is available, the FARS shall be supplied by an external mobile air connection in accordance with Section L104.14. Where a fire department mobile air unit is not available, a stored pressure air supply shall be provided in accordance with Section L104.5.1. A stored pressure air supply shall be permitted to be added to a system supplied by an external mobile air connection provided that a means to bypass the stored pressure air supply is located at the external mobile air connection.

L104.5.1 Stored pressure air supply. A stored pressure air supply shall be designed based on Chapter 24 of NFPA 1901 except that provisions applicable only to mobile apparatus or not applicable to system design shall not apply. A stored pressure air supply shall be capable of refilling not less than 50 empty breathing air cylinders of a size and pressure used by the fire department.

L104.5.2 Retrofit of external mobile air connection. A FARS not initially provided with an external mobile air connection due to the lack of a mobile air unit shall be retrofitted with an external mobile air connection where a mobile air unit becomes available. Where an external mobile air connection is provided, a means to bypass the stored pressure air supply shall be located at the external mobile air connection. The retrofit shall be completed not more than 12 months after notification by the fire code official.

L104.6 Isolation valves. System isolation valves that allow access for the fire department shall be installed on the system riser to allow piping beyond any air cylinder refill panel to be blocked.

L104.7 Pressure relief valve. Pressure relief valves shall be installed at each point of supply and at the top or end of every riser. The relief valve shall meet the requirements of CGA S-1.3 and shall not be field adjustable. Pressure relief valves shall discharge in a manner that does not endanger personnel who are in the area. Valves, plugs or caps shall not be installed in the discharge of a pressure relief valve. Where discharge piping is used the end shall not be threaded.

L104.8 Materials and equipment. Pressurized system components shall be listed or approved for their intended use and rated for the maximum allowable design pressure in the system. Piping and fittings shall be stainless steel.

L104.9 Welded connections. Piping connections that are concealed shall be welded.

L104.10 Protection of piping. System piping shall be protected from physical damage in an approved manner.

L104.11 Compatibility. Fittings and connections intended to be used by the fire department shall be compatible with the fire department's equipment.

L104.12 Security. Connections to a FARS shall be safeguarded from unauthorized access in an approved manner.

L104.13 Fill stations. Firefighter air replenishment fill stations shall comply with Section L104.13.1 through L104.13.3.

L104.13.1 Location. Fill stations for refilling breathing air cylinders shall be located as follows:

1. Fill stations shall be provided at the fifth floor above and below the ground level floor and every third floor level thereafter.
2. On floor levels requiring fill stations, one fill station shall be provided adjacent to a required exit stair at a location designated by the fire code official. In buildings required to have three or more exit stairs, additional fill stations shall be provided at a ratio of one fill station for every three s*tairways*.

L104.13.2 Design. Fill stations for breathing air cylinders shall be designed to meet the following requirements:

1. A pressure gauge and pressure-regulating devices and controls shall be provided to allow the operator to control the fill pressure and fill rate on each cylinder fill hose.
2. Valves controlling cylinder fill hoses shall be slow-operating valves.
3. A separate flow restriction device shall be provided on each fill hose.
4. A method shall be provided to bleed each cylinder fill hose.
5. The fill station shall be designed to provide a containment area that fully encloses any cylinder being filled and flexible cylinder fill hoses, and directs the energy from a failure away from personnel. Fill stations shall be designed to prohibit filling of cylinders that are not enclosed within the containment area.

   Exception: Where required or approved by the fire chief, fill stations providing for the direct refilling of the firefighters' breathing air cylinders using Rapid Intervention Crew/Company Universal Air Connection (RIC/UAC) fittings shall be used in lieu of cylinder fill stations that utilize containment areas.

L104.13.3 Cylinder refill rate. Fill stations shall be capable of simultaneously filling two or more empty breathing air cylinders equivalent to those used by the fire department to the cylinders' design pressure within 2 minutes.

L104.14 External mobile air connection. An external mobile air connection shall be provided for fire department mobile air apparatus where required by Section L104.5 to supply the system with breathing air.

L104.14.1 Location. The location of the external mobile air connection shall have access for mobile air apparatus and approved by the fire code official.

L104.14.2 Protection from vehicles. A means of vehicle impact protection in accordance with Section 312 shall be provided to protect mobile air connections that are subject to vehicular impact.

L104.14.3 Clear space around connections. A working space of not less than 36 inches (914 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of external mobile air connections.

L104.15 Air monitoring system. An approved air monitoring system shall be provided. The system shall automatically monitor air quality, moisture and pressure on a continual basis. The air monitoring system shall be equipped with not less than two content analyzers capable of detecting carbon monoxide, carbon dioxide, nitrogen, oxygen, moisture and hydrocarbons.

L104.15.1 Alarm conditions. The air monitoring system shall transmit a supervisory signal when any of the following levels are detected:

1. Carbon monoxide exceeds 5 ppm.
2. Carbon dioxide exceeds 1,000 ppm.
3. An oxygen level below 19.5 percent or above 23.5 percent.
4. A nitrogen level below 75 percent or above 81 percent.
5. Hydrocarbon (condensed) content exceeds 5 milligrams per cubic meter of air.
6. The moisture concentration exceeds 24 ppm by volume.
7. The pressure falls below 90 percent of the maintenance pressure specified in Section L104.3.

L104.15.2 Alarm supervision, monitoring and notification. The air monitoring system shall be electrically supervised and monitored by an approved supervising station, or where approved, shall initiate audible and visual supervisory signals at a constantly attended location.

L104.15.3 Air quality status display. Air quality status shall be visually displayed at the external mobile air connection required by Section L104.14.

SECTION L105—ACCEPTANCE TESTS

L105.1 Acceptance tests. Upon completion of the installation, a FARS shall be acceptance tested to verify compliance with equipment manufacturers' instructions and design documents. Oversight of the acceptance tests shall be provided by a registered design professional. Acceptance testing shall include all of the following:

1. A pneumatic test in accordance with ASME B31.3 of the complete system at a minimum test pressure of 110 percent of the system design pressure using oil free dry air, nitrogen or argon shall be conducted. Test pressure shall be maintained for not less than 24 hours. During this test, all fittings, joints and system components shall be inspected for leaks. Defects in the system or leaks detected shall be documented and repaired.
2. A cylinder-filling performance test shall be conducted to verify compliance with the required breathing air cylinder refill rate from the exterior mobile air connection and, where provided, a stored air pressure supply system.
3. The air quality monitoring system shall be tested to verify both of the following conditions:
   3.1. Visual indicators required by Section L104.15.1 function properly.
   3.2. Supervisory signals are transmitted as required by Section L104.15.2 for each sensor based on a sensor function test.
4. Connections intended for fire department use shall be confirmed as compatible with the fire department's mobile air unit, SCBA cylinders and, where provided, RIC/UAC connections.
5. Air samples shall be taken from not less than two fill stations and submitted to an approved gas analysis laboratory to verify compliance with NFPA 1989. The FARS shall not be placed into service until a written report verifying compliance with NFPA 1989 has been provided to the fire code official.

SECTION L106—INSPECTION, TESTING AND MAINTENANCE

L106.1 Periodic inspection, testing and maintenance. A FARS shall be continuously maintained in an operative condition and shall be inspected not less than annually. Not less than quarterly, an air sample shall be taken from the system and tested to verify compliance with NFPA 1989. The laboratory test results shall be maintained on site and readily available for review by the fire code official.

SECTION L107—REFERENCED STANDARDS

L107.1 General. See Table L107.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE L107.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASME B31.3—2022	*Process Piping*	L104.2.1, L105.1
CGA S-1.3—2020	Pressure Relief Device Standards—Part 3 *Stationary Storage Containers for Compressed Gases*	L104.7
NFPA 1901—16	*Standard for Automotive Fire Apparatus*	L104.5.1
NFPA 1989—13	*Breathing Air Quality for Fire Emergency Services Respiratory Protection*	L104.2.2, L105.1, L106.1

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX M – HIGH-RISE BUILDINGS—RETROACTIVE AUTOMATIC SPRINKLER REQUIREMENT

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

M

HIGH-RISE BUILDINGS—RETROACTIVE AUTOMATIC SPRINKLER REQUIREMENTS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix M was created with the intent to provide an option for adoption by jurisdictions that choose to require existing high-rise buildings to be retrofitted with automatic sprinklers. Modern fire and building codes require complete automatic fire sprinkler protection and a variety of other safety features in new high-rise construction. Many older high-rise buildings lack automatic sprinkler protection and other basic fire protection features necessary to protect the occupants, emergency responders and the structure itself. Without complete automatic sprinkler protection, fire departments cannot provide the level of protection that high-rise buildings demand. Existing high-rise buildings that are not protected with automatic sprinklers represent a significant hazard to occupants and firefighters, and can significantly impact a community's infrastructure and economic viability in the event of a fire loss.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION M101—SCOPE

M101.1 Scope. An automatic sprinkler system shall be installed in all existing high-rise buildings in accordance with the requirements and compliance schedule of this appendix.

SECTION M102—WHERE REQUIRED

M102.1 High-rise buildings. An automatic sprinkler system installed in accordance with Section 903.3.1.1 shall be provided throughout existing high-rise buildings.

Exceptions:

1. Airport traffic control towers.
2. Open parking structures.
3. Group U occupancies.
4. Occupancies in Group F-2.

SECTION M103—COMPLIANCE

M103.1 Compliance schedule. Building owners shall file a compliance schedule with the fire code official not later than 365 days after receipt of a written notice of violation. The compliance schedule shall not exceed 12 years for an automatic sprinkler system retrofit.

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX N – INDOOR TRADE SHOWS AND EXHIBITIONS

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
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APPENDIX

N

INDOOR TRADE SHOWS AND EXHIBITIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix:	Appendix N was created to address the hazards that are associated with larger, more complex trade shows and exhibitions. Although many of these requirements are already included in various locations in this code, some of the more important items, such as requirements for covered booths and multiple-level booths, are not. The intent is to have the requirements covering these events in a single location with pointers to other locations within this code, which makes it easier for those organizing exhibitions and individual exhibitors who are unfamiliar with the fire code to locate the requirements that are applicable to them.
ICC code development note:	Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION N101—GENERAL

N101.1 Scope. Indoor trade shows and exhibitions with temporary vendor displays or booths within any indoor occupancy classification shall be in accordance with this appendix and all other applicable requirements of this code.

Compliance with this appendix is not required where Section N101.1.1 or N101.1.2 is applicable.

N101.1.1 Nonsprinklered buildings. In a building that is not equipped throughout with an automatic sprinkler system, the aggregate exhibit area must be less than 1,500 square feet (139 m^2) of floor area and meet both of the following conditions:

1. The exhibit area does not include any covered or multiple-level exhibits or booths.
2. Not fewer than two remote exits or exit access doors in compliance with Chapter 10 are provided.

N101.1.2 Sprinklered buildings. In a building that is equipped throughout with an automatic sprinkler system with a minimum design density of ordinary hazard Group 1, the aggregate exhibit area must be less than 4,500 square feet (418 m^2) of floor area and meet both of the following conditions:

1. The exhibit area does not include any covered or multiple-level exhibits or booths.
2. Not fewer than two remote exits or exit access doors in compliance with Chapter 10 are provided.

N101.2 Permit required. An operational permit for trade shows and exhibitions shall be required as set forth in Section 105.5.15.

N101.3 Application. A permit application for a trade show or exhibition shall be submitted to the fire code official prior to the start of the event in a time frame established by the jurisdiction. The application shall include documentation that identifies all of the following:

1. The means of egress.
2. The locations and widths of exits and aisles.
3. The locations of exit signs.
4. The total square footage (square meters) of spaces.
5. The location and arrangement of all booths and cooking equipment.
6. The location of all fire protection equipment.
7. The type and location of any heating and electrical equipment, where applicable.
8. The location of any covered or multiple-level booths.
9. Construction documents for any covered or multiple-level booths.
10. The storage locations and quantities of any highly combustible goods.
11. The location and type of any vehicle displays, where applicable.

SECTION N102—DEFINITIONS

N102.1 Definitions. For the purpose of this appendix, certain terms are defined as follows:

COOKING. Heating food products to a temperature of 145°F (63°C) or higher by baking, braising, boiling, frying or grilling.

COVERED BOOTH. An exhibit that has an obstruction placed over the exhibit above floor level that resembles a roof, canopy, tent or other obstruction, other than vertical signs or banners.

MULTIPLE-LEVEL BOOTH. An exhibit that has a second level or tier constructed on top of the exhibit or portion of the exhibit that is open to the public, or includes a live load above the exhibit area floor level.

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SECTION N103—PUBLIC SAFETY FOR EVENTS

N103.1 Fire safety and evacuation plan. A fire safety and evacuation plan shall be provided in accordance with Section 404.2.

Exception: Where the fire code official determines that the nature of the exhibition, display or the activities therein does not pose an increased hazard to public safety.

N103.2 Fire watch personnel. Where, in the opinion of the fire code official, it is essential for public safety in a trade show or exhibition, either because of the number or persons present or because of the nature of the performance, exhibition, display or activity, the owner or owner's authorized agent shall provide one or more fire watch personnel in accordance with Section 403.11.1.

N103.3 Crowd managers. Where events involve a gathering of more than 1,000 people, trained crowd managers shall be provided in accordance with Section 403.11.3.

SECTION N104—INTERIOR FINISH AND DECORATIVE MATERIALS

N104.1 General. Interior finish, interior trim, furniture, furnishings and decorative materials, including decorative vegetation, used in exhibition areas shall comply with the requirements of this section and Chapter 8.

N104.2 Interior wall and ceiling finish. The materials used for interior wall and ceiling finish of exhibit booths and displays in exhibition areas shall comply with one of the following:

1. Where the building is not equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the wall and ceiling finish materials are required to be Class A in accordance with Section 803.
2. Where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, the wall and ceiling finish materials are required to be not less than Class B in accordance with Section 803.

SECTION N105—MULTIPLE-LEVEL BOOTHS

N105.1 Construction documents. Construction documents for all multiple-level booths shall be stamped by a registered design professional and shall be submitted with the permit application to the fire code official or the building code official, as appropriate.

N105.2 Structural design. Multiple-level booths shall be designed and constructed in accordance with Chapter 16 of the *California Building Code*.

N105.3 Means of egress. Upper levels of multiple-level booths with an occupant load greater than 10 persons shall have not fewer than two exits or exit access that are separated in accordance with Section 1007.1.1.

N105.4 Automatic sprinkler systems. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be provided in multiple-level booths exceeding 400 square feet (37.2 m^2) in floor area per level.

N105.5 Inspection. Inspection to verify that multiple-level booths are constructed in accordance with the construction documents and structural design details required by this section shall be approved by the building code official.

N105.6 Fire alarm and detection. Each multiple-level booth with a floor area exceeding 120 square feet (11.1 m^2) on any level shall be provided with an approved fire alarm system in accordance with Section 907.2.

SECTION N106—COVERED BOOTHS

N106.1 Automatic sprinkler systems. An approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be provided in covered booths exceeding 100 square feet (9.3 m^2) in floor area per level.

N106.2 Fire alarm and detection. Each covered booth with a floor area exceeding 120 square feet (11.1 m^2) on any level shall be provided with an approved fire alarm system in accordance with Section 907.2.

SECTION N107—DISPLAY AND STORAGE OF HAZARDOUS AND COMBUSTIBLE MATERIALS

N107.1 Hazardous materials. The display of hazardous materials shall comply with Section 314 and Chapters 50 through 67. The storage of hazardous materials in indoor trade shows and exhibition areas shall be prohibited.

N107.1.1 Display near exit. The display of hazardous materials within 5 feet (1524 mm) of an *exit* shall be prohibited.

N107.2 Storage of combustible materials. Storage of combustible materials shall comply with Section 315.

N107.3 Vehicles. The display of liquid- or gas-fueled vehicles, boats or other motor craft in indoor trade shows and exhibition areas shall comply with Sections 314.4 and N107.3.1 through N107.3.3.

N107.3.1 Batteries in vehicles. Vehicle batteries shall be rendered inoperable. Batteries in liquid- and gas-fueled vehicles shall be disconnected. Batteries in electric vehicles shall be rendered inoperable by the removal of fuses or other approved methods but shall not be required to be disconnected.

N107.3.2 Vehicle fuel. Vehicle fuel shall comply with Sections N107.3.2.1 through N107.3.2.4.

N107.3.2.1 Fueling within the structure. Vehicles shall not be fueled or defueled within the structure.

N107.3.2.2 Vehicle fuel tanks. Vehicle fuel tanks shall contain not more than one quarter of the tank capacity or 5 gallons (18.93 L) of fuel, whichever is less.

N107.3.2.3 Vehicle fuel systems. Vehicle fuel systems shall be inspected for leaks prior to the vehicle being brought into the structure.

N107.3.2.4 Vehicle fuel tank openings. Vehicle fuel tank openings shall be locked and sealed to prevent the escape of vapors.

N107.3.3 Obstruction by vehicles. Vehicles shall not be located in such a manner that they obstruct a means of egress.

N107.3.4 Gas-powered vehicles. Compressed natural gas (CNG), liquefied petroleum gas (LPG) or hydrogen-powered vehicles present in indoor trade shows and exhibition areas shall comply with Sections N107.3.4.1 through N107.3.4.3.

N107.3.4.1 Shutoff valves. Shutoff valves shall be closed and the engine shall be operated until it stops. Valves shall remain closed until the vehicle is removed.

N107.3.4.2 Battery hot lead. The hot lead of the battery shall be disconnected.

N107.3.4.3 Dual-fuel vehicles equipped to operate on gasoline. Dual-fuel vehicles equipped to operate on gasoline as well as on CNG, LPG or hydrogen shall comply with Section 3108.14.

N107.3.5 Competitions or demonstrations. Competitions or demonstrations using any type of vehicle shall comply with Section 3108.14.5.

N107.4 Fueled equipment other than vehicles. Fueled equipment other than vehicles shall comply with Section 313.

N107.5 LP-gas containers. Liquefied petroleum (LP) gas containers shall comply with Sections N107.5.1 through N107.5.5 and Chapter 61.

N107.5.1 LP-gas containers exceeding 12 pounds (5 kg) of water capacity. The use of LP-gas containers exceeding 12 pounds (5 kg) of water capacity shall be prohibited.

N107.5.2 Where more than one LP-gas container is present in the same area. Where more than one LP-gas container is present in the same area, cylinders shall be separated from each other by a minimum of 20 feet (6096 mm).

N107.5.3 Equipment for LP-gas containers. Equipment for LP-gas containers, including tanks, piping, hoses, fittings, valves, tubing and other related components, shall be approved and shall comply with Chapter 61 and with the applicable requirements of the *International Fuel Gas Code*.

N107.5.4 Securing of LP-gas containers. Portable LP-gas containers shall be securely fastened in place to prevent unauthorized movement.

N107.5.5 Spare LP-gas containers. Spare LP-gas containers not connected to an approved appliance shall be stored in a location and manner approved by the fire code official.

N107.6 Cooking and open-flame devices. All cooking equipment and any open-flame devices shall comply with the requirements of Section 308 of this code and with Chapter 5 of the *California Mechanical Code*. Cooking equipment shall be separated from combustible material display or storage by a horizontal distance of not less than 5 feet (1524 mm).

SECTION N108—MEANS OF EGRESS

N108.1 Means of egress from the indoor trade show or exhibition area. Means of egress from the indoor trade show or exhibition area shall comply with Chapter 10 and with Sections N108.2 and N108.3.

N108.2 Design of means of egress. The design of means of egress shall take into consideration the exhibit layout and the anticipated crowd movement during the event.

N108.3 Aisles and corridors. Aisles and corridors within the exhibit area shall be kept free of obstructions when the public is present. Storage of any kind in aisles or corridors within the exhibit area is not permitted.

SECTION N109—REFERENCED STANDARDS

N109.1 General. See Table N109.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE N109.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
CBC—25	*California Building Code*	N105.2
IFGC—24	*International Fuel Gas Code*	N107.5.3
CMC—25	*California Mechanical Code*	N107.6

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CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX O – VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

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APPENDIX

O

VALET TRASH AND RECYCLING COLLECTION IN GROUP R-2 OCCUPANCIES

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance or legislation of the jurisdiction.

User notes:

About this appendix: Appendix O provides for valet trash and recycling collection services in Group R-2 occupancies. These collection services are formally defined in Section 202 as "Valet Trash Collection," which includes recycling. Occupants receiving this service place trash and recyclables in the corridor outside their residence for pickup by a collection service on a regularly scheduled basis in accordance with restrictions, as prescribed by this appendix.

ICC code development note: Code change proposals to this appendix will be considered by the IFC Code Development Committee during the 2024 (Group A) Code Development Cycle.

SECTION O101—SCOPE

O101.1 Scope. Valet trash collection in Group R-2 occupancies shall comply with this appendix.

SECTION O102—CONTAINERS

O102.1 General. Containers used for valet trash collection shall comply with Sections O102.2 through O102.5.

O102.2 Integrity. Valet trash or recycling materials shall be stored in containers that are of liquid-tight construction and equipped with lids. Lids shall be in the fully closed position.

O102.3 Height. Containers shall not exceed 30 inches (762 mm) in height.

O102.4 Capacity and limit. Individual containers shall not exceed 2.0 cubic feet (15 gallons; 56.8 L) in capacity. Only one trash or recycling container per dwelling unit or sleeping unit shall be permitted to be placed outside the dwelling unit or sleeping unit at one time. Trash and recycling containers shall not be placed outside a dwelling unit or sleeping unit at the same time.

O102.5 Construction materials. Containers and lids used for valet trash collections shall be constructed entirely of noncombustible materials or of materials that meet a peak rate of heat release not exceeding 300 kW/m^2 when tested in accordance with ASTM E1354 at an incident heat flux of 50 kW/m^2 in the horizontal orientation.

SECTION O103—CONTAINER LOCATION

O103.1 General. Placement of containers used for valet trash collection outside a dwelling unit or sleeping unit shall comply with Sections O103.2 and O103.3.

O103.2 Minimum means of egress width. Containers used for valet trash collection shall not obstruct the minimum required egress width.

O103.3 Stairways. Containers used for valet trash collection shall not be placed on stair risers, within minimum required stairway landing dimensions or anywhere in an interior exit stairway.

SECTION O104—ADDITIONAL REQUIREMENTS

O104.1 Time limits. Filled containers used for valet trash or recycling services shall not be placed outside a dwelling unit for more than 6 hours within any 24-hour period. Empty approved containers used for valet trash or recycling services shall not remain in a corridor for more than 12 continuous hours in a 24-hour period.

O104.2 Collection rules. The property owner or manager shall have written valet service rules, hours and penalties provided to all tenants and occupants. The property owner or manager shall be responsible for implementing, monitoring and enforcing all valet trash collection rules. A copy of the rules shall be provided to the fire code official upon request.

O104.3 Suspension of service. The fire code official has the authority to order the suspension of valet trash collection that is not in compliance with this appendix.

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SECTION O105—REFERENCED STANDARDS

O105.1 General. See Table O105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, standard title, and the section or sections of this appendix that reference the standard.

TABLE O105.1—REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM E1354—17	*Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*	O102.5

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX P – TEMPORARY HAUNTED HOUSES, GHOST WALKS AND SIMILAR AMUSEMENT USES

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
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[California Code of Regulations, Title 19, Division 1]																							
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APPENDIX

P

TEMPORARY HAUNTED HOUSES, GHOST WALKS AND SIMILAR AMUSEMENT USES

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

SECTION P101—GENERAL

P101.1 Scope. *These regulations shall apply to temporary haunted houses, ghost walks or similar amusement uses, where decorative materials and confusing sounds and/or visual effects are present and shall be in accordance with this Appendix.*

P101.2 Permits. *An operational permit shall be required for haunted houses, ghost walks or similar amusement uses in accordance with Appendix P101.2.*

P101.2.1 Permit documents. *The permit application shall include a dimensioned site plan and floor plan.*

A site plan showing the following:

1. *The proximity of the event building(s) to other structures or hazardous areas.*
2. *The path of travel from the event building or area to the public way.*
3. *The location of exterior evacuation assembly points.*

A floor plan showing the following:

1. *Dimensions of the area being used (include total square footage, width and types of exits, aisles or interior exit pathways, etc.).*
2. *The path of travel shall include the layout of any mazes, mirrors or other display items that may confuse the egress paths.*
3. *A brief description of what will be depicted in each room or area along the walk or course, including the type of special effects to be utilized.*
4. *Location of exits, exit signs and emergency lighting.*
5. *Location of electrical panel(s) and light switches.*
6. *Identification of what the normal or prior use of the structure(s) being used is (i.e., auditorium, school, church, etc.).*
7. *Accessible egress routes.*
8. *When required, areas of refuge.*
9. *When required by Section 907.2.12, fire alarm panel location, manual fire alarm boxes and horn/strobe locations.*
10. *Portable fire extinguisher locations.*
11. *The location and fuel capacity of all generators.*

SECTION P102—DEFINITIONS

P102.1 DECORATIVE MATERIALS. *All materials used for decorative, acoustical or other effect (such as curtains, draperies, fabrics, streamers and surface coverings) and all other materials utilized for decorative effect (such as batting, cloth, cotton, hay stalks, straw, vines, leaves, trees, moss and similar items), including foam plastics and other materials containing foam plastics.*

P102.2 HAUNTED HOUSE. *A temporary building or structure, or portion thereof, which contains a system that transports passengers or provides a walkway through a course so arranged that the means of egresses are not apparent due to theatrical distractions, not visible due to low illumination, are disguised or are not readily available due to the method of transportation through the building or structure.*

P102.3 GHOST WALKS. *Similar to haunted houses and may include both indoor and outdoor areas where the means of egresses are similarly not readily identifiable.*

SECTION P103—GENERAL REQUIREMENTS

P103.1 Allowable structures. *Haunted houses, ghost walks and similar amusement uses shall only be located in structures that comply with the provisions for Special Amusement Areas in accordance with the California Building Code.*

P103.2 Tents or membrane structures. *Tents and membrane structures may be used when in compliance with all applicable requirements of this regulation and when the total floor area of the tent is less than 1,000 square feet and the travel distance to an exit from any location is less than 50 feet.*

P103.3 Fire evacuation plans. *A fire safety and evacuation plan that complies with Section 404 of this code shall be submitted.*

P103.4 Staffing. *The event shall be adequately staffed by qualified person(s) to control the occupant load and assist patrons in exiting should an evacuation become necessary. Staffing level shall be determined upon review of plans and may be increased at the discretion of the Fire Code Official.*

P103.5 Occupant load. *Maximum occupant load shall be in accordance with Chapter 10, Table 1004.1.1. A sign stating maximum occupancy shall be posted in a visible location near the entrance. The attendant(s) shall control the flow of patrons so as not to exceed this limit.*

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P103.6 Exits. *Exiting shall be in accordance with Chapter 10 and this section.*

1. *Two exits shall be provided from each room with an occupant load of 50 or more. Required exit doors shall swing in the direction of egress.*
2. *Illuminated exit signs shall be provided at each exit serving an occupant load of 50 or more.*
3. *Exit doors serving an occupant load of 50 or more shall not be provided with a latch or lock unless it is panic hardware.*
4. *When tents or membrane structures are approved for use, curtains shall not be allowed to cover the exits.*
5. *Emergency lighting shall be provided in exit pathways.*
6. *Exhibits and decorative materials shall not obstruct, confuse or obscure exits, exit pathways, exit signs or emergency lights.*
7. *Additional exit pathway markings, such as low level exit signs and directional exit path markings, may be required.*

P103.7 Fire protection. *Haunted houses and ghost walks shall be provided with fire protection systems in accordance with Appendix P103.7.*

Exception: *When the total floor area of haunted houses or indoor portions of ghost walks are less than 1,000 square feet and the travel distance to an exit is less than 50 feet.*

P103.7.1 Fire sprinkler protection. *An automatic fire sprinkler system shall be required for haunted houses and indoor portions of ghost walks. Fire sprinkler systems shall be in accordance with Section 903.*

P103.7.2 Fire detection systems. *An approved automatic fire detection system shall be provided in accordance with Section 907.2.12, as required for amusement buildings.*

P103.7.3 Alarm. *Activation of any single smoke detector, the fire sprinkler system or other automatic fire detection device shall be in accordance with Section 907.2.12.1.*

P103.7.4 Emergency voice alarm. *Provide an emergency voice/alarm communication system in accordance with Section 907.2.12.3, as required for amusement buildings.*

P103.7.5 Portable fire extinguishers. *Fire extinguishers shall have a minimum 2A-10B:C rating. Fire extinguishers shall be properly mounted and shall be visible and accessible at all times. Clearly identify locations with signs or reflective tape. Fire extinguishers shall be located within 50 of feet travel distance from anywhere in the building.*

P103.8 Electrical. *When required, a permit shall be obtained from the local building official.*

P103.8.1 Extension cords. *Extension cords shall be UL listed and shall be appropriate for the intended use.*

P103.8.2 Power strips. *Only UL listed power strips with overcurrent protection shall be used when the number of outlets provided is inadequate. Power strips shall be plugged directly into the outlet, and shall not be plugged into one another in series.*

P103.8.3 String lighting. *Manufacturer's installation guidelines shall be followed for the maximum allowable number of string lights that can be connected. When connecting string lights together, the total amperage of all string lights shall be calculated to ensure that they do not exceed the amperage for the extension cord and circuit.*

P103.8.4 Protection. *All extension cords and power strips shall be adequately protected from foot traffic.*

P103.8.5 Portable generators. *When portable generators are utilized, they shall be diesel fuel type and located a minimum of 20 feet away from all structures.*

P103.9 Decorative materials. *Interior wall, ceiling and floor finishes shall be Class A rated in accordance with the California Building Code.*

P103.9.1 Flame retardant. *All decorative materials shall be both inherently flame retardant and labeled as such, or shall be treated with a listed flame-retardant material. If the material is treated by the user, a container and receipt will serve as proof.*

P103.9.2 Flame test. *Testing shall be done in accordance with Section 803.5 of this code, as referenced from the California Code of Regulations, Title 19, Division 1, Article 3, Section 3.21(a) and (b). Proof of testing shall be provided.*

P103.9.3 Placement of decorative materials. *Decorative materials, props and/or performer platforms shall not obstruct, confuse or obscure exits, exit signs, exit pathways, emergency lighting or any component of fire protection systems and equipment (i.e. fire extinguishers, fire alarm systems, fire sprinklers, etc.) inside or outside the building.*

P103.10 Smoke generators. *Use of smoke-generating equipment may be restricted if determined to be incompatible with smoke alarm(s). Care and consideration shall be used with respect to smoke generator and smoke alarm locations. Smoke generator and smoke alarm locations shall be approved by the fire department.*

P103.11 Display of motor vehicles. *Display of motor vehicles shall be in accordance with Section 3104.18 of this code.*

P103.12 Inspections. *A fire and life safety inspection shall be conducted by the fire department prior to the start of the event.*

P103.13 Signs. *"NO SMOKING" signs shall be conspicuously posted at the main entrance and throughout the exhibit.*

P103.14 Prohibited areas. *Inside storage or use of flammable and/or combustible liquids, gases and solids shall be prohibited. Open flames shall be prohibited.*

P103.15 Maintenance. *Good housekeeping shall be maintained at all times throughout exhibit and exit pathways.*

CALIFORNIA FIRE CODE – MATRIX ADOPTION TABLE
APPENDIX Q – COMMUNITY WILDLAND-URBAN INTERFACE (WUI) FIRE HAZARD EVALUATION FRAMEWORK

(Matrix Adoption Tables are nonregulatory, intended only as an aid to the code user.
See Chapter 1 for state agency authority and building applications.)

(Not adopted by the State Fire Marshal)

Adopting Agency	BSC	BSC-CG	SFM		HCD			DSA		OSHPD						BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
			T-24	T-19*	1	2	1/AC	AC	SS	1	1R	2	3	4	5								
Adopt Entire Chapter																							
Adopt Entire Chapter as amended (amended sections listed below)																							
Adopt only those sections that are listed below																							
[California Code of Regulations, Title 19, Division 1]																							
Chapter / Section																							

* The *California Code of Regulations* (CCR), Title 19, Division 1 provisions that are found in the *California Fire Code* are a reprint from the current CCR, Title 19, Division 1 text for the code user's convenience only. The scope, applicability and appeals procedures of CCR, Title 19, Division I remain the same.

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APPENDIX

Q

COMMUNITY WILDLAND-URBAN INTERFACE (WUI) FIRE HAZARD EVALUATION FRAMEWORK

Wildland-Urban Interface (WUI) fire spread has significant impact on communities well beyond the loss of structures, including community evacuation and incident response. Pre-fire planning and hazard mitigation impact how the fire develops, how the life safety of residents and first responders is impacted during evacuations, and the extent of structural and infrastructure losses. There is a need to document pre-fire hazard in a way that assesses the fire impact beyond potential structural losses.

This appendix contains a preliminary Community WUI Fire Hazard Evaluation Framework as a suggested methodology to begin to support communities at risk in the identification of their unique hazards and to provide common metrics for comparisons between communities. This preliminary framework includes information on community size, population and fuels; on notification and evacuation; and on the community infrastructure and firefighting response potential. Aspects of this framework may already be included in various community-level documents, such as Community Wildfire Protection Plans or evacuation plans. Development of a standard framework will (1) consolidate relevant WUI fire hazard and planning information in one place, and (2) allow for cross-community comparisons.

The evaluation required to implement this framework will support pre-fire hazard assessment and during-fire response operations. An increased understanding of fire-evacuation, fire-structural response and fire-defensive actions relationships is needed to assess the overall community WUI fire hazard. The quantification of these relationships will enable communities to optimize the community-level response to WUI fire hazards in a more integrated approach and result in increased life safety and reduced losses.

Definitions

The Community WUI Hazard Evaluation Framework presented here is intended for communities as small as a few hundred to tens of thousands of residents. The methodology is not intended for the documentation of single residences or large cities. It is intended to provide a community with an overview of the overall WUI fire-related hazards and to enable the authority having jurisdiction (AHJ) to compare the relative hazards and preparedness levels of different communities. The information collected can be used by first responders and community and county officials to prioritize hazard mitigation within and around the community and to develop "tabletop" responses to different WUI fire scenarios. In the event of an actual WUI fire, the information collected could be used by first responders and local officials to safely evacuate civilians, to reduce the risk of first responder injuries and to enhance fire containment. The following are definitions and uses of the different components of the Community WUI Fire Hazard Evaluation Framework. This framework may be expanded to include additional characteristics that are not specifically listed in this preliminary version.

Community

In the sense of WUI fire hazard, the community should be viewed in the context of evacuation arteries rather than jurisdictional boundaries. As such, the community may have parts that are incorporated or unincorporated. Community size is reported in acres, and the community boundary selected for this hazard evaluation can be provided for use in a geographic information system (GIS) layer in a number of formats, including but not limited to shapefile, geodatabase or Geo-Package. A topographic overview of the area (community) is used to describe the general conditions using one or more of the following key words: flat terrain, rolling hills, moderate slopes, valleys, steep slopes and/or plateau.

Information about prevailing weather patterns, such as localized winds or significant wind events (strength and direction), should also be included in the community profile.

Fuels

The fuels section is intended to provide an overview of the structural, vegetative and other fuels present in the community. This is not a parcel-level assessment; however, if defensible space assessment data is available, it can be aggregated and utilized within this framework to provide higher resolution assessment of community fire hazard. Structure density is a simple metric to capture structure-to-structure spacing and provide insight on the potential structure-to-structure fire spread. For uniform communities, a representative structure separation distance (SSD) may be sufficient, whereas nonuniform communities will be better described using a histogram of SSD. The age of structures may also be a factor in structure vulnerability due to changes in building codes associated with structure hardening. Similarly, a community that was built over a short period of time can be represented by a single value representing the decade of construction, while a community that grew and expanded over long periods will be better represented by a histogram of structure ages.

A database such as LANDFIRE[1] can provide the vegetative fuel type and fuel loading throughout the community. This data will be limited by the age of the last LANDFIRE overflight and the 100 feet (30 meters) pixel spatial resolution.

Natural and artificial fuel breaks, including fuel treatments within and around the community, should be represented in a geospatial format and should include the year the vegetative fuel treatment was conducted. Fuel treatments should also include any logging activities in the area surrounding the community. Fire history in and around the community will describe the last time the community

1. Landfire website: https://www.landfire.gov/

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experienced direct impacts from fire. Shapefiles of the fuel treatments and fire history will allow for spatial documentation of this data. Fuel treatments and fire history should be documented at least 10 miles (16 km) out from the edge of the community. Local conditions (e.g., fuel, topography, weather, evacuation routes) may require documentation well beyond 10 miles (16 km). The last large fire in the area of the community perimeter, together with the vegetative fuel loading, will provide information on the potential energy content of the vegetative fuels in the event of a short- or long-term drought.

The documentation of other community hazards, such as hazmat or high fuel load facilities (e.g., fixed propane tanks, hazardous material storage and use facilities, ammunition facilities lumber yards, pallet storage, tire storage), is important as they can affect civilians and first responder safety during evacuations, fire containment and mop-up activities. The information should be provided in the form of a GIS layer and may then be used by first responders to develop "tabletop" responses for emergency preparedness, and to direct response actions during a WUI fire event.

Population

The population of the selected community will impact, among other factors, the minimum time required for evacuation. Population and population density, expressed as the number of residents per acre, are both important metrics that provide information that can be used for evacuation assessment. The permanent to transient population density ratio is intended to capture the fraction of the community that may be visiting for tourism and may not be aware of community evacuation and other fire related activities.

Notification

The notification section of the Community WUI Hazard Evaluation is designed to capture the presence and type of mass-notification tools available to emergency managers. It should be noted that reliance on individual notification methods may result in limited notifications. If a Reverse 911 system is in place, the percentage of the community that will potentially receive the notifications from this system will estimate the number of residents that may require different notification(s). Sirens or other fixed notification systems with power backup should also be listed in this section along with the fraction of the population covered by these systems. Additional notification systems that don't require phone or internet are also captured in this section, since WUI events frequently result in power outages or other service interruptions.

Evacuation

This section of the Community WUI Hazard Evaluation is not intended to replace a full community evacuation study or act as a community evacuation plan. The primary purpose of this section is to compute, given a number of assumptions, a Minimum Throughput Time (MTT), to provide an initial idealized order of magnitude time to be considered in the early stages of evacuation pre-planning. This information can be of value to first responders and community emergency planning personnel, as it may potentially highlight critical evacuation bottlenecks inside or outside the community.

The MTT concept is a traffic engineering calculation of roadway capacity to provide an initial lower bound for planning community evacuation. The MTT is intended for isolated and partly isolated interface and intermix communities rather than a city setting with large populations and complex evacuation routes. A community should consider a detailed evacuation study to further enhance the community evacuation plan. There is a significant body of work associated with developing dynamic evacuation models.[2]

The MTT considers two significant factors: bottlenecks within and beyond town, and the total number of vehicles that must be accommodated. Bottlenecks slowing traffic throughput may be located within or outside of jurisdictional boundaries. Bottlenecks occurring well beyond the evacuating community may cause ripple effects significantly impacting community evacuation. In identifying the population for computing the MTT, consideration should be given to neighboring settlements/communities that may share the same evacuation route(s). The MTT should consider the minimum number of traffic lanes (i.e., 8 lanes merging into 2 lanes should be treated as 2 lanes) available for evacuation, the community population and the average speed limit of the egress routes. Contraflow, the implementation of reverse direction traffic flow, may be considered here, along with provisions for first responder access to the community. The computed Minimum Throughput Time (MTT) does not account for any of the numerous potential hindrances to evacuation traffic, such as road accidents, reduced speed due to smoke obscuration, merging of traffic in town to feed the primary arteries, large vehicles that occupy more space than cars and have reduced maneuverability, or fire activity impacts, such as burn overs, causing evacuation lane(s) closures and potential slowdowns associated with traffic redirections.

The evacuation section is also used to identify vulnerabilities of egress arteries including vegetative fuel setbacks as well as any hazardous material facilities which might affect evacuation. Fuel setback information, collected in 0.15 miles (0.25 km) increments along egress routes, presented in the form of a histogram and a GIS layer, could help identify vulnerable spots that may potentially impact evacuation and identify candidate locations for fuel treatments.

The presence of a Community Evacuation Plan, the presence and capacity of safety zones and other large crowd assembly areas, and whether evacuation drills are performed will contribute to the community evacuation preparedness overview. The number of hospitals and senior care facilities and their total capacity will provide further information to assess overall community evacuation needs.

2. An example of a framework which includes coupled fire and evacuation considerations, as well as background on the individual model components, is provided in Ronchi et al. (2019) "An open multi-physics framework for modelling WUI fire evacuations," Safety Science 118:868-880.

COMMUNITY WUI FIRE HAZARD EVALUATION FRAMEWORK		
COMMUNITY	***DATA TYPE***	***DATA LAYER IN MDS***
Community shapefile, geodatabase or Geo-Package including topography and geographic attributes, and prevailing weather patterns (e.g., wind)	*GIS layer*	*x*
FUELS		
Structure Density (structure separation distances—SSD)	*SSD histogram*	
Age of structures	*Histogram*	
Vegetative Fuel Loading: *- Fuel type* *- Fuel loading*	 *Fuel type* *Tons/acre*	
Natural and artificial fuel breaks (including fuel treatments within and around community and year built)	*List, GIS layer*	*x*
Community hazards (e.g., hazmat and high fuel load facilities)	*Specify, GIS layer*	*x*
Fire History	*Frequency of, and most recent, fires in/around community*	*x*
POPULATION		
Population *- Density* *- Permanent/transient ratio*	*Number, age distribution* *Number/acre* *p/t ratio*	
NOTIFICATION		
Reverse 911 *- Opt-in or Opt-out* *- Percent of population enrolled in Reverse 911*	 *Opt-in/Opt-out* *%*	
Sirens or other notification with power backup *- Percent of population within siren coverage range*	*List* *% population*	
Notification dissemination w/out phone or internet	*y/n*	
EVACUATION		
Egress Route Capacity (Minimum Throughput Time)	*Time (hours)*	
Vulnerability of egress arteries: *- Fuel setbacks* *- Hazmat/high fuel load facilities affecting evacuation* *- Other*	 *Fuel setback data, GIS layer* *Specify, GIS layer*	 *x* *x* *x*
Hospitals and senior care facilities	*Specify, number of persons*	*x*
Community evacuation plan *Safety zones and large crowd assembly areas, capacity* *Evacuation drills*	*y/n, specify, GIS layer* *y/n, number, GIS layer* *y/n*	 *x* *x*
Community in evacuation route of other communities, through-flow number	*y/n, identify, number*	
INFRASTRUCTURE / COOP / COG		
Location and needs of key facilities	*List*	*x*
Public water, dependence on power, generator backup, community owned water	*y/n, y/n, y/n, y/n*	
Power lines around primary arteries (above ground or below)	*Above or below*	*x*
Critical infrastructure that requires fuel to keep operating	*Specify, GIS layer*	*x*
FIREFIGHTING RESPONSE		
Volunteer vs Career (availability of first responder resources at station)	*Volunteer/career/combination*	
Density of firefighting (ff) responder to number of structures (ff/structure ratio)	*ff/structures*	
Mutual aid response (engines-hours histogram) and agreements with mutual aid	*Engines-hours histogram*	

Infrastructure / COOP / COG

The locations and needs of key facilities for maintaining continuity of operations (COOP) and continuity of government (COG), such as police, fire, EMS, hospitals, government buildings, cell towers, water sources, water provider infrastructure, electrical utility key infrastructure and natural gas key infrastructure should be listed and incorporated in this part of the evaluation framework.

Infrastructure characteristics, particularly related to water supply and electric utilities, can impact response and potential pre-fire hazard reduction. The public water system dependence on power supply, including the availability of backup power sources (i.e., generator backup) will provide insight into the resilience of the water system. The location of power lines (i.e., above or below ground) can impact evacuation, as downed power lines can impact evacuation and mobility throughout the community.

Firefighting Response

The type of fire department, whether volunteer, career, or combined, may impact the likely availability and response time of first responder resources. The density of firefighting (ff) responders, as a ratio of the number of personnel on shift to the number of structures (number of ffs/number of structures) will provide information on the maximum possible coverage by the local resources.

In this section, mutual aid resources should be counted only if mutual aid agreements are in place and can ensure rapid deployment. Mutual aid response is captured through a histogram in 1-, 2-, 3- and 4-hour travel times. This may also be approximated using a geographic radius of distance from the community. The purpose of this information is to provide insight into the minimum response times by mutual aid.

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HISTORY NOTE APPENDIX

2025 California Fire Code
California Code of Regulations, Title 24, Part 9

HISTORY:

For prior code history, see the History Note Appendix to the *California Fire Code,* 2022 Triennial Edition, effective January 1, 2023.

1. (SFM 06/24)—Adoption by reference of the 2024 *International Fire Code* with necessary amendments to become the 2025 *California Fire Code*, and repeal of the 2021 edition of the *International Fire Code.* Approved by the California Building Standards Commission on February 26, 2025, filed with Secretary of State on March 7, 2025, and effective on January 1, 2026.
2. Erratum to address miscellaneous corrections in Matrix Adoption Tables and throughout Chapters 1, 2, 4, 5, 6, 8, 9, 10, 11, 32, 33, 50, 57, 59, Appendices B, C and Index, effective January 1, 2026.

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